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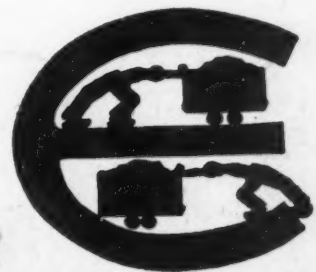
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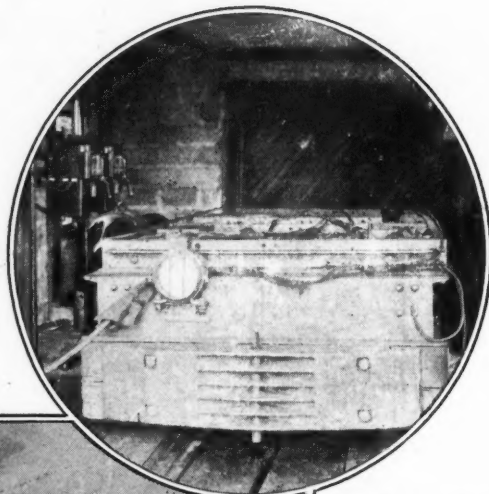
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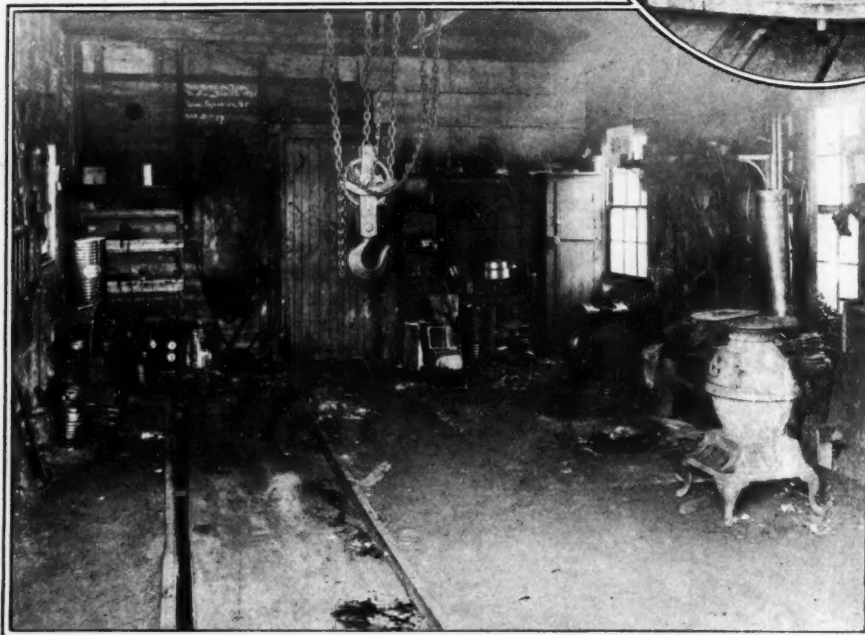
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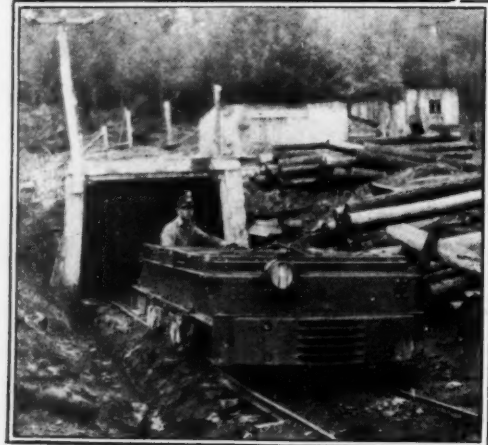


When miners have to wait for cars it's bad for their morale and it's bad for company profits. When Exide-Ironclad Batteries are on the job to hustle the empties in and the loads out, there's very little waiting for empties done. The speed and pep of this battery holds up all day long.

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To Lower Haulage Costs

WE USUALLY think of a shoveling machine as a mechanical device used for loading coal into mine cars. These machines, however, may and frequently do find other application underground.

Next week Frank H. Kneeland will describe how shoveling machines are being used to load out cuts and fills on the main haulage entries of a group of mines in Kentucky. By this means the work of bringing an undulating bottom to grade is greatly simplified. Furthermore, this dead work can be performed at a less cost by shovel than the same work could be done by hand.

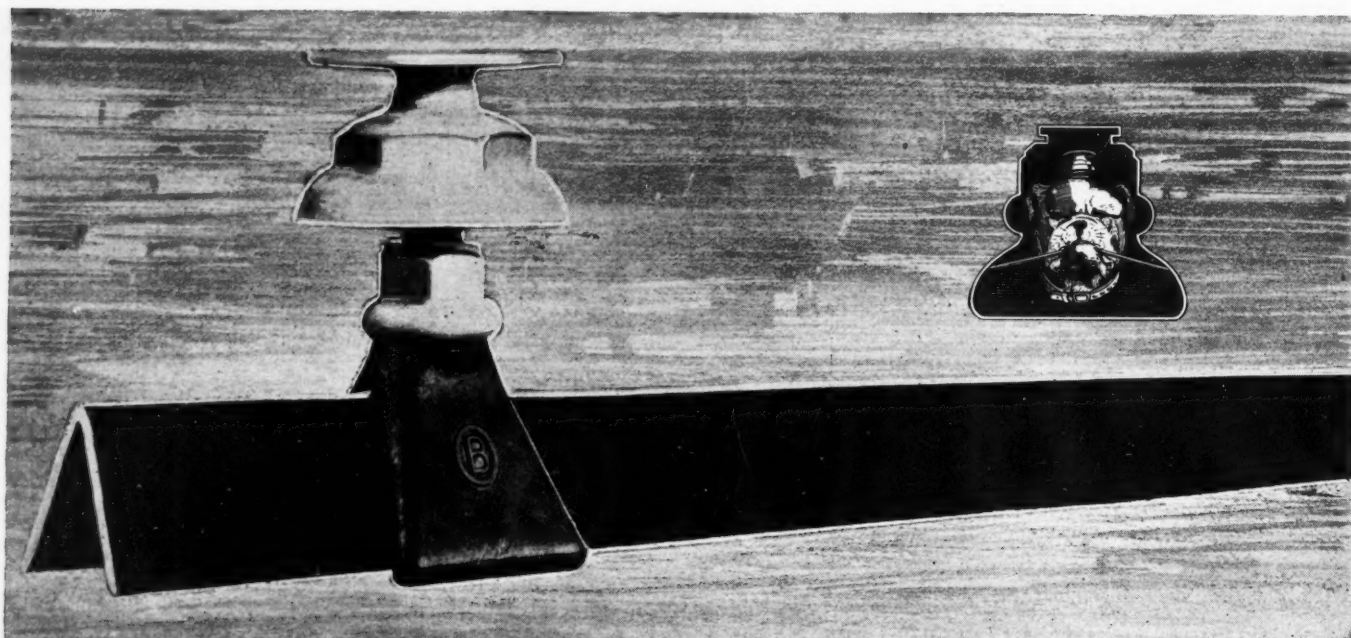
Best of all the shovel does the work rapidly. Changing grades on a main haulage may be an extremely expensive operation, because in most cases such a change entails a more or less pronounced interference with haulage operations. With two power shovels, one at either end of the cut, such changes can frequently be made over a week end and with no interference with haulage.

* * *

ALABAMA is making headway with rock dusting, as is the rest of the country. The Alabama engineers are thinking the problem out for themselves, and J. H. Edwards during his visit to that state recorded what the outcome of this thinking has been. His observations will appear in next week's issue.

* * *

ANOTHER article will describe the results of investigations as to liquid oxygen as an explosive. This rock-shattering material familiarly known as LOX, can be used by coal men only in surface work. It seems well adapted to employment in strip pits.



The Bulldog tackles another task



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The New Bulldog Clamp — popular as pay-day in the mines.



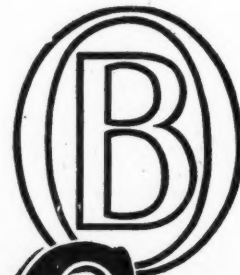
The Bulldog Cable Clamp for feeder cable suspension from insulated hangers.

Using inverted angle iron as a trolley, doesn't eliminate Bulldog from the picture. Not by a long shot! In fact the Bulldog Clamp is just as much at home with this type of overhead as with a wire trolley.

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COAL AGE

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Devoted to the Operating, Technical and Business
Problems of the Coal-Mining Industry

R. DAWSON HALL
Engineering Editor

Volume 29

NEW YORK, MARCH 4, 1926

Number 9

Coal as an Ice Remover

NONE of the modern problems in cities is more perplexing than that of removing snow and ice. In one storm in 1920 New York City spent \$5,500,000 for the service and yet did not do the work either speedily, thoroughly or without hindrance to traffic. The ideal way to remove the ice would be by heat. By this method the snow would in fact not be removed, it would melt as it falls and the sidewalk would be kept clear, saving labor and the suits that follow falls on the icy pavements, keeping the walks free for loading operations or for business and making trading at the stores attractive.

A foot of snow just freshly fallen weighs from 5 to 12 lb. per cubic foot. The latent heat of fusion for snow is about 143 B.t.u. per pound, and as snow may fall at a temperature of 10 deg. below freezing 165 B.t.u. of heat will serve to raise the temperature enough not only to assure melting but the transfer of the water over the curb or to cause it to evaporate into the dry air. Taking the heavier weight of snow per foot of fall and assuming a foot of precipitation, the number of British thermal units needed to melt the snow and give it a final temperature of 10 deg. above freezing, having fallen at 20 deg., would require 1,980 B.t.u. per sq.ft. Assuming that there is a waste in heat such that twenty times as much coal is used as the thermal capacity of that fuel would indicate, the quantity of heat needed would be 39,600 B.t.u., or about the heat in three pounds of coal. If the cost of the coal as stoked into the furnace was \$10 per ton the cost of melting by steam in the manner indicated would be 1½c. per sq.ft. and a pavement 16 ft. wide and 100 ft. long would be cleared for \$24.

Probably in most cities there would be but three such storms in a year and a cost of \$72 would not be excessive. Such a pavement would supply enough snow to fill five wagons for a precipitation of one foot, and the cleaning of the sidewalk, the loading of the snow on the wagon and the transfer of it over slippery, drifted streets to the wharf might easily cost \$25, or \$75 for three such snows. However, as the municipality pays for the cartage there probably would be an apparent total loss in such melting because the city would be relieved at the cost of the owner.

Perhaps municipalities might be disposed to allow a reduction in taxes where such cleaning by steam pipes is provided. It might be arranged also that the owner would keep the snow off the street to its center and thus help in the general clearing of the roadway. Perhaps it would not be unconstitutional to require newly constructed buildings ten stories or more in height or buildings of over five stories constructed for manufacturing purposes to provide pipes and boiler capacity for the removal of snow on the sidewalk and in the road.

Such high buildings create an unusual density of traffic and an obligation rests on the owners to relieve in part the congestion which the intensive use of their building space makes inevitable.

What an assistance to communication it would be if, at least, two main thoroughfares in New York City were provided in some such manner with complete equipment for removing the snow as fast as it fell.

High Discovery Depletion Builds Up Oil Competition

THE NEW TAX LAW revises the depletion clauses relating to "discovery" of mines and of oil and gas wells. In the case of metal mines more liberality is shown than in the past in that the law requires that "discoveries" shall include ore in commercial quantities contained in a vein or deposit discovered in an existing mine or mining tract if the vein or bed thus discovered is not merely an extension of a vein or bed already known to exist. In other words, a disconnected commercial orebody in a known mineralized zone is eligible for discovery valuation for depletion purposes, provided it has not been included in a former valuation.

The revision of the discovery depletion allowances in no way benefits the coal industry. The only depletion that this industry can get is based on cost, or March 1, 1913, value. The coal beds of the United States have been accurately mapped by state and federal surveys, and this fact is held to preclude discovery, coal lands being purchased or leased only when commercial coal is known to exist.

The discovery depletion allowed oil in 1921 to 1923 averaged 70c. per barrel (30 per cent) on the total production, while the total depletion on coal (based on cost and March 1, 1913, value) was approximately 6c. per ton, or only about 2 per cent of the selling price of coal. This disparity is still greater when it is realized that the heating value of a barrel of oil is only a quarter to a third that of a ton of coal. The wide variation in tax-free allowances for those two competing industries is a question that the National Coal Association might well consider.

In the amount of depletion allowable in the case of oil and gas wells the new tax law is definite. Discovery depletion, as such, is not mentioned, but the law specifically states that "In the case of oil and gas wells the allowance for depletion shall be 27½ per centum of the gross income from the property during the taxable year. Such allowance shall not exceed 50 per centum of the net income of the taxpayer (computed without allowance for depletion) from the property except that in no case shall the depletion allowance be less than it would be if computed without reference to this paragraph."

As between the discovery depletion allowable for

mines, and the 27½ per cent deduction for oil wells, the oil industry has by far the greatest advantage, for the depletion deduction will cover an entire pool even more effectively than did the discovery clause in the earlier laws. The average percentage of discovery depletion for oil wells in 1921 to 1923 was approximately 30 per cent of gross income. There is, therefore, a slight reduction, but the rate is entirely too high, for it means that practically 50 per cent of the net income will be tax-free. The average depletion on cost is about 5 per cent of gross income, leaving 40 to 45 per cent of net income as development appreciation to be written off as depletion, after all exploration and production costs have been deducted.

Mine Mapping Reduces Dangers

MINE maps should always be kept up to date. By this means only can the superintendent and other general operating officials make frequent eye-surveys of mine workings to determine the degree of safety of new development. These men do not have the time to make personal inspections of a mine as thoroughly or as often as might be desired. Between times they must rely upon the mine map to convey knowledge of extensions of workings. To serve this purpose, consequently, the map must be reasonably accurate.

A daily extension of the map will aid in the avoidance of many dangers. A weekly correction will reduce the probability of an impending danger. No working map should stand uncorrected for periods greater than a week.

The importance of accurate map-keeping has been proved by private and state investigations of a number of explosions which have taken place in the past few years. Entries have been driven far ahead of fresh air, crosscuts outby of the last have been left open, doors omitted, etc., unknown to the superintendent and more frequently to the general management.

Not so long ago a number of men worked under conditions more dangerous than they at the time realized, while taking part in the rescue after an explosion in a mine in which a "bleeder" entry was allowed to remain open long after it had ceased to serve a specific and safe purpose. The opening was not plotted on the map nor was the management aware of its existence. The oversight might have caused a second explosion.

A danger or an approach to such a condition ought to be indicated on the map on the day it is noted. Underground officials could facilitate this procedure by jotting down in a notebook abnormal conditions in any place, which at the end of each shift should be indicated so far as possible on the map in the outside mine office.

Those Fortunes in Anthracite

IN THE year 1925 the reports made by the several anthracite companies to the Treasury showed the aggregate of the net incomes in the previous year, fiscal or calendar, as the case might be to total \$28,611,281. They also showed a total of the net losses sustained to be \$6,791,469. Deducting net losses from net income the whole of the anthracite industry made a net earning, excluding Federal taxes, of \$21,819,812.

No wonder when the secret was revealed by the publication of the tax returns, the public was convinced that the producing of anthracite was a poorly compen-

sated business. The United Fruit Co., for instance, in which no one but the stockholders are interested showed a profit of \$26,218,015.55 before payment of income tax. It would be futile to compare that twenty-two million made in the anthracite industry with the \$120,982,531.89 made by General Motors or the \$165,000,000 and more made by the U. S. Steel Corporation. Still less will it stand comparison with the earnings of Mr. Ford.

The output of anthracite in 1924 deducting what was used at the mines for steam and heat was 80,291,438 net tons. So the profit per marketed ton was 27.1c. and for whole tonnage produced 24.8c. Truly a lot of pother has been made about a most niggardly profit, and the pity of it is that many who if they were in the business would want a return four or five times as large are among the persons who have been most voluble in criticism. If industry generally was conducted on margins comparable with those on anthracite the cost of living would make a notable decline.

Diesel-Electric Transportation

JUST what place the Diesel-electric engine, with its replacement of oil for coal, is going to take in the railroad industry remains to be seen. The disposition is to say that it is any man's guess, but back of it all is a belief that as means are adapted to ends it may have an increasing place in the transportation industry, especially for yard work and for traffic not dense enough for true electrification but near enough to cities to make smokelessness important. It has good powers of acceleration because of its high horsepower at low speeds, but it is not suited for use where stops are frequent because it constitutes such a huge weight to be accelerated. This all seems to be conceded. What is not clear is what place it has in main-line operation, especially for freight service.

The Diesel-electric engine in itself alone is not exceedingly heavy but it needs heavy foundations and therefore a heavy truck beneath it. Much electric equipment goes with it, also adding seriously to the weight and to the weight of the carriage. A steam locomotive will weigh 140 lb. per horsepower, but the present Diesel-electric equipment will weigh from 250 to 300 lb. per horsepower. Some are hoping that 200 lb. will be the figure ultimately obtained.

The cost of the Diesel-electric unit is three or four times that of the steam locomotive, but the fuel cost is only 30 per cent as large and the Diesel-electric engine should easily work twice as many hours as a steam locomotive, for it fuels seldom and takes water even less frequently, runs without repair and has no firebox to clean out. For these reasons, as C. A. Stein, the general manager of the Central Railroad of New Jersey, has said, its cost of operation should be one-fifth that of the steam engine working on anthracite and one-third of the same prime mover working on bituminous coal.

The large outlay, the weight on the drivers and conservatism will hold back the Diesel-electric locomotive. Samuel M. Vauclain may have been right when he said at the Midwest Power Conference at Chicago, Ill.: "It is my opinion that considerable time must elapse and many millions of dollars be expended in the development of an oil-electric power unit in the shape of a locomotive before machines of this type will figure to any great extent in transportation service."

Recent Improvements in Automatic Centrifugal Pump Control Simplify Apparatus

Time-Delay Relay Takes Place of Notching Type—
Adjustments Are Made to Suit Pumping Conditions—
In Case of Trouble Pump Is Locked Out of Service

By R. S. Sage*
Schenectady, N. Y.

THE DRAINAGE problem of a coal mine is one of the most important the operator has to solve. In the anthracite field there are many instances where an average of twenty tons of water must be pumped for every ton of coal produced and this ratio in some cases is much greater. It is highly important, therefore, that the pumping apparatus be adequate in every particular and, at the same time, its operation should be carried on as economically as possible. Mine pumps usually have to operate intermittently over long periods and therefore require either manual attendance or an automatic system which accomplishes the same results with complete reliability.

Rapid progress has been made during the past two or three years in the application of automatic control equipment to mine pumps, and the system has now been brought to a point which assures success in handling all operating conditions which arise in such service. Manual attendance, where automatic apparatus is used, has been almost completely dispensed with, and best of all, without in any manner compromising the dependability of the plant. As a result large savings in operating expense have accrued to the operators. Fortunately, the automatic system involves no excessive capital outlay for additional apparatus and yet is not complicated.

Some publicity already has been given to the automatic pumping systems which have been adopted with great success in the anthracite fields. Therefore, the present article will deal with a recent improvement in the control equipment, particularly in the manner of securing successive restarts of the pump.

Automatic control equipment described in this article refers to centrifugal pump installations only, there being no particular problem attending the automatic starting and stopping of plunger type pumps. When centrifugal pumps are operated with a suction lift, it is necessary that the pump be primed before it will deliver water. The use of foot valves often makes priming unnecessary, but such valves are not always considered dependable, as they are likely to leak from one cause or another. Therefore, in automatic installations operating under a suction lift, a priming pump is an essential part of the equipment.

The sketches in Figs. 1 and 2 are included so as to illustrate the apparatus involved and the functions they perform. Referring to Fig. 1, the apparatus comprising the complete equipment will be found listed in the drawing. Fig. 2 is a simplified wiring diagram reference to which should be made in connection with the explanation which follows.

When the sump fills with water to a predetermined height, the float switch, 5, closes its contacts and estab-

lishes a circuit through contact *b* of the time relay and the interlock *a* of the master contactor, *A*, to the solenoid-operated valves 9 to the contactor starter, 8, of the priming pump motor, and to the motor, *M*, of the time relay, *B*. The priming pump then starts and proceeds to exhaust the air from the main pump casing through the valves, which are held open by the energized solenoids.

The air is drawn through the vacuum breaker, 6. As the air is being exhausted, water rises into the pump casing and eventually is drawn through the priming pipes and into the vacuum breaker. As the water level in the vacuum breaker rises, a float causes electric contacts mounted thereon to close.

The closing of the contact, 6, completes a circuit through the operating coil of the master contactor, *A*, which closes its contacts, *e*, and opens its interlock contacts, *a*, with the following results:

(a) A shunt circuit around 6 is made through 10 and 11 (when these latter are closed).

(b) A circuit is made to the magnet, *S*, of the time relay, *B*, and its timing action begins to function from this instant. The energizing of this relay magnet causes the contact, *d*, to close at once, establishing for itself a holding circuit.

(c) A circuit is made to the starter, 7, for the main pump motor, which is brought up to its normal running speed.

(d) Contacts *a* open, thereby de-energizing the starter, 8, shutting down the priming pump and de-energizing the solenoid-operated priming valves, causing them to close.

As soon as the main pump has reached a sufficient speed high pressure is developed which closes the con-

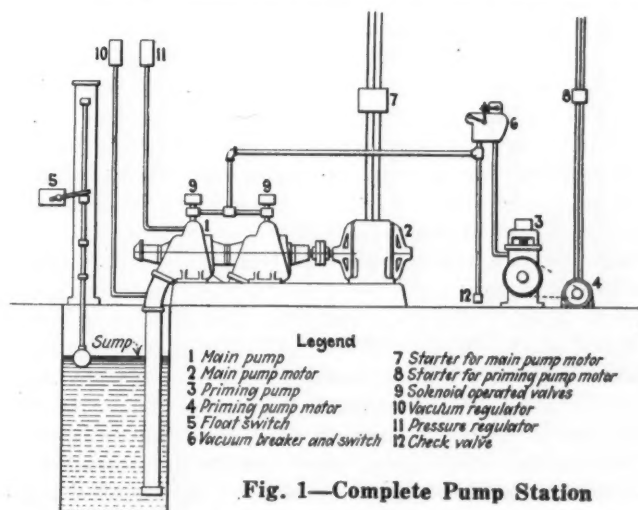


Fig. 1—Complete Pump Station

tacts of the pressure regulator, 11, which completes the parallel circuit to the coil of the master contactor. When the priming of the main pump is completed and the solenoid valves are closed, no more water is drawn over into the vacuum breaker. This device is so con-

*Mr. Sage is of the industrial department, General Electric Co.

structed that, when its compartment is filled, the rising of its float opens a valve to atmosphere, thereby allowing the water to drain out through the pipe and check valve shown in Fig. 1. This also causes the switch 6 to open again, but not until 11 has closed so that a circuit to the master contactor coil is maintained.

The interval between the closing of the solenoid-operated priming valves, indicating completion of the priming operation and the opening of the vacuum breaker switch, 6, is approximately fifteen seconds. This is normally ample time for the main pump to build up pressure and close the pressure switch 11.

The timing relay, usually set for a period of about two minutes, releases its contact *b* after a predetermined time delay and closes the contact *c*. Normally this operation has no result whatever, as the master contactor is already closed and the opening of contact *b* does nothing except disconnect the small motor *M* or relay *B*.

The starting cycle is now completed and the main pump continues to run until the level of water in the sump has been lowered to a predetermined level, when the float switch 5 opens and the apparatus stops.

Consideration should now be given to the way in which the apparatus functions when, for some reason, the pump does not go into service as intended. If, for instance, the pressure switch 11 fails to close, indicating that the pump did not build up its proper pressure—as would be caused by a broken discharge pipe, leaks in the suction pipe, etc.—the master contactor will be de-energized when the vacuum breaker switch opens and the pump will be shut down. The pump would then be reprimed and the starting procedure would be repeated as previously explained. Such starts and restarts would occur until the time relay *B* opened the circuit at *b*. This happens at the expiration of the period for which the relay is adjusted. The timing of this relay may be adjusted to allow three, four or more restarts before it will permanently disconnect the pump control apparatus from the power supply. When the circuit is broken at *b* a circuit is established at *c* for the alarm bell which serves to indicate that inspection of the equipment is necessary.

It may frequently be the case that more than one start is necessary before the pump is properly brought into operation. For instance, if a long discharge line must be filled, the vacuum breaker switch may open before the pressure regulator closes on the first trial, or enough air may remain in the pump casing on the first attempt to prevent the pressure regulator from closing before the vacuum breaker switch opens and thus shuts down the main pump.

The vacuum regulator 10 protects the pump against operation with an excessive suction lift such as could result from a clogged intake on the suction pipe or failure of the float switch to stop the pump when the predetermined low water level is reached. In some cases the operation of the vacuum regulator instead of the float switch is relied upon to shut down the equipment at low sump level. Also, some outfits are installed so that they may be stopped or started by a push button located at a remote point instead of by a sump float switch. In such instances a throw-over switch may be used to permit operation by the float switch or from the push-button station, as desired.

It is common practice to provide reverse-phase and phase-failure protective devices in the main motor

circuits in addition to overload and under-voltage relays, thus insuring against improper electrical conditions. It is also recommended that all equipments include bearing temperature relays for the main motor and the pump. These relays would then be connected into the control circuit to stop the machines in case bearing temperatures became excessive. With the installation of these simple devices practically every conceivable emergency is provided against.

If the priming pump fails to prime the main pump, the vacuum breaker will not close the master contac-

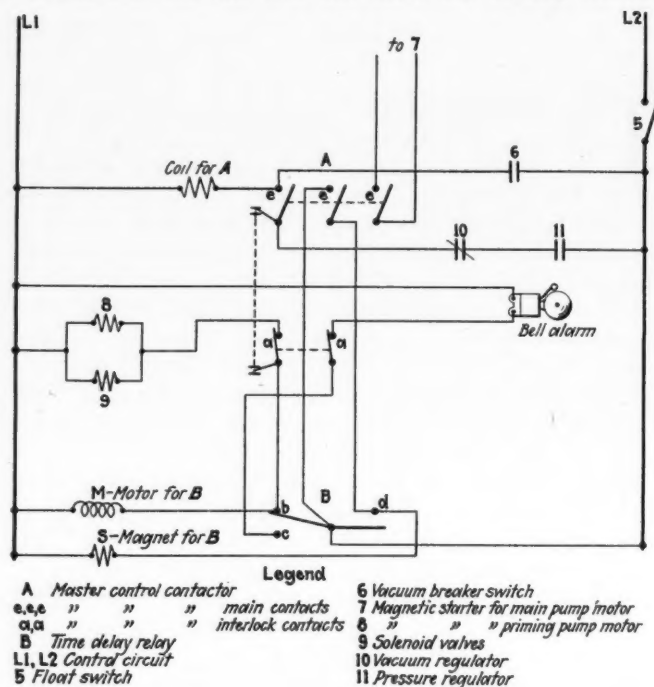


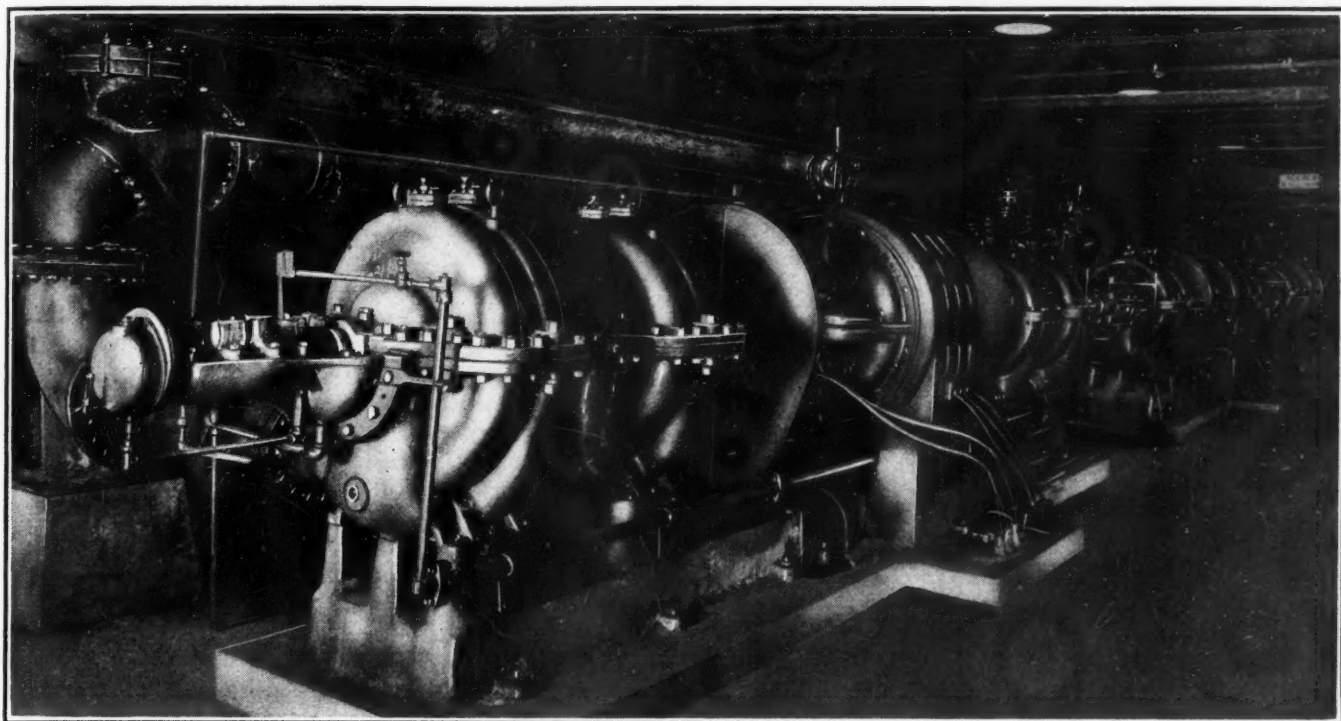
Fig. 2—Wiring and Control Devices Used With Automatic Apparatus Are Simple and Reliable

A time-delay relay is used to limit the number of restarts the equipment will make before the control circuits are automatically locked out. This simplifies the protective and control apparatus.

tor, with the result that the priming pump will continue to operate unless some means is supplied to prevent it. This can be taken care of by providing an additional time-delay relay so adjusted as to open the circuit to the priming pump motor after the lapse of 20 or 30 minutes. If this relay is not provided, no harm can result, as the type of priming pump generally used is suitable for continuous operation. Moreover, such a condition would soon be brought to the attention of someone by the ringing of another bell alarm indicating a high sump level.

In case the automatic equipment is shut down by the action of either of the time-delay relays it is necessary for the operator, after he has corrected whatever fault exists, to reclose the time relay so that automatic operation can be resumed. A reset push button is provided for this purpose.

It is by the application of relay *B* that this system differs from the original control equipment developed for this service. Previously, the system included a form of notching relay which permitted the apparatus to make a definite number of restarts, usually three, before permanently locking out the control devices. The substitution of the time relay somewhat simplifies the circuits and increases the dependability of the system as a whole, because the relay employed is a standardized product used in large numbers on motor starters and other control apparatus.



A Few New Minor Changes Improve Automatic Pumping Service

By E. J. Gealy
New York, N. Y.

IT IS a remarkable fact that ever since the first complete automatically primed, started, protected and stopped centrifugal pumping outfit was designed and put in operation only a few minor changes or improvements have been found necessary. Most of the installations recently made are primarily the same as those described in the Sept. 13, 1923, issue of *Coal Age*. However, a few improvements have simplified and perfected the operation of the original automatic features.

Where a single centrifugal pump is primed by an automatic motor-driven priming pump a spring-operated valve illustrated in Fig. 1 may be used. The valve itself is constructed the same as the original solenoid-operated type but is actuated by means of a spring instead of a solenoid.

The spring-operated valve is held closed against a spring by the pressure developed in the centrifugal pump. When the pump is stopped the power of the spring is sufficient to open the valve.

Air easily passes through the passages of the valve, but when the centrifugal pump is primed and develops pressure the valve closes. Once closed in this manner it stays tight and does not leak, because the plunger is held on its seat by the pump pressure.

Headpiece

These three eight-stage 2,000-gal. per minute centrifugal pumps at the Greenwood Colliery of the Lehigh Coal & Navigation Co. automatically come into service as required. When the water level in the sump rises to a predetermined level one of the units starts. If the water level continues to rise, another unit automatically steps in to help. Should these two pumps fail to prevent the water from rising further, the third unit gets under way. As the water recedes each unit is stopped in its proper sequence. All these operations are automatically controlled without any manual attendance whatsoever.

A leather washer on the end of the valve stem is used to seal the valve against air leaks while it is open. This feature obviates the necessity of packing the valve and also reduces its friction.

EQUIPMENT FOR TWO OR MORE PUMPS

The electric control equipment of automatic pumping outfits has been slightly improved by changes designed to handle two or more pumping outfits from one priming pump. Fig. 2 shows a wiring diagram of a two-pump control system operated from two float switches. The second pump is prevented from coming into operation by means of a timing relay in the circuit of the first pump. A triple-pole, double-throw switch is provided to make the starting sequence of the two pumps selective.

Quite similar control apparatus has also been designed to start, as required, any number of pumps in the same station. If the water level in the sump unduly increases after the first pump has operated for a time, the second pump is automatically put into service. If the water still continues to rise, a third pump is automatically started and placed in operation. As the water level recedes the pumps go out of service in their proper sequence. Such a station located at the Greenwood Colliery of the Lehigh Coal & Navigation Co. near Lansford, Pa., is shown in the headpiece.

Another feature of control relating to the rate at which the starting contactors of the motor controller are closed has been improved. In this connection when sufficient time was not permitted before the pump motor was thrown directly on the power line for the motor

to come up nearly to full speed, the pump seemed to lose its water. The column of water in the suction line or in the pump appeared momentarily to part when the motor speed was suddenly increased from a low value to full speed. Lately this difficulty has been removed

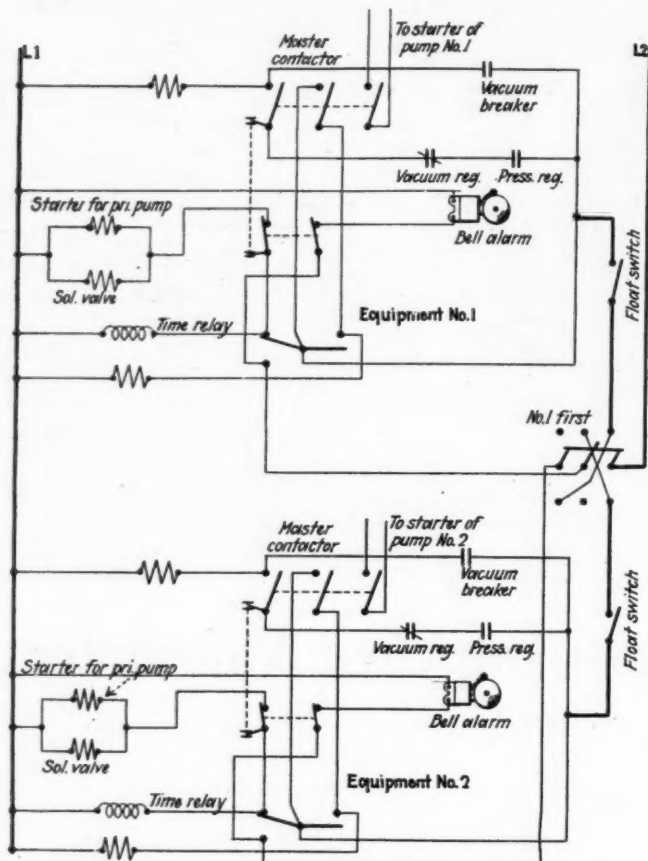


Fig. 1—Two-Pump Control System

This diagram shows the wiring circuits used when two pumps are primed by one motor-driven priming pump. Each centrifugal unit is controlled by its own float switch

by adjusting the contactor switches on panels connected to wound-rotor induction motors so that the motor nearly reaches full speed soon after the first contactors are closed. Thus there is no sudden jerk when all the motor resistance is cut out and the motor brought up to full running speed.

Economies of operation, maintenance and repair are rapidly popularizing these recent innovations in centrifugal pump control and interest in the system is already spreading to other industries.

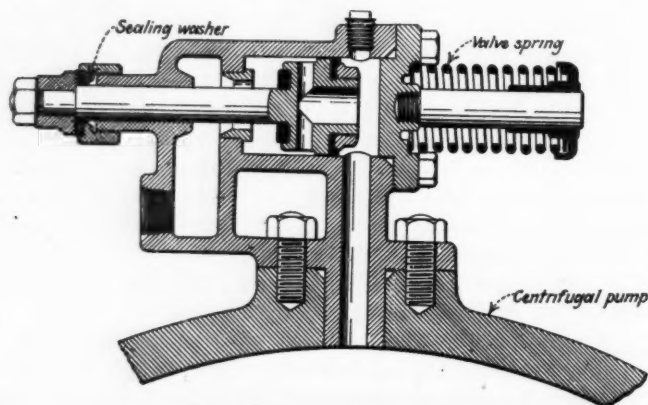


Fig. 2—Spring-Operated Priming Valve

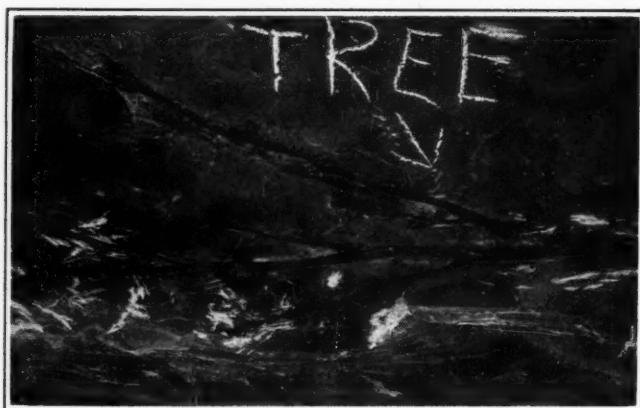
The valve itself is the same as the solenoid type. The spring is connected to the valve through a crosshead and tie rods

Mine Roof Reveals Unusual Fossil of Carboniferous Tree

A COALIFIED fossil, which from a scientific point of view is probably the most valuable specimen of a tree of the Carboniferous period ever discovered, because it combines so many hitherto unknown or only suspected characteristics of the tree it represents, is now on exhibit at the Carnegie Institute of Technology, Pittsburgh, Pa. The U. S. Bureau of Mines classifies this fossil as that of the extreme tip of a *Lepidodendrum lanceolatum* (meaning a family of ancient, fern-like trees with a bark composed of overlapping scales and leaves which are lance-shaped). The fossil was discovered recently by Superintendent James Adamson in the Harmar mine, in the Double Freeport seam, of the Consumers Mining Co., Harmarville, Pa.

Back about 200 million years ago a fern-like forest grew in a bed of mud which lay over a thick deposit of peat-like material in the vicinity of what is now Harmarville. The tip of one of these trees fell undamaged into this mud which later was submerged by a sea and then covered by a thick deposit of limestone. During a later period these deposits were uplifted and in subsequent years eroded to the topography of the region in the present day. The pressure subjected by the heavy overburden changed the peat deposit into coal, which is now known as the Double Freeport seam, and coalified the tip of the tree in the mud above the bog without changing the surface structure of the tree tip, such as the leaf scars and bark patterns.

During one of his rounds of inspection Mr. Adamson happened to notice a short, lenticular spur in the shale roof at the mouth of a chute between two main headings, about 500 ft. from the slope of the Harmar mine.



Mine Chief Found This Fossil

Carboniferous period tree imbedded in the roof above the Double Freeport coal seam in the Harmar mine near Pittsburgh, Pa. The fossil is somewhat distorted because of the angle at which the photograph was taken.

Suspecting that the exposed spur might be a projection of a large fossil body hidden by a slab of shale, he pried down the latter and uncovered a fossil roughly measuring 4 ft. in length from tip to tip. A *Coal Age* camera was focused on the fossil as it hung in place in the roof, with the result shown in the accompanying illustration.

Mr. Adamson appreciated the scientific value of his find and set a crew to work removing the fossil. This was finally accomplished by drilling close together a series of holes on a rectangular border. The slab was then reinforced with cement in a protecting box and loosened.

Artificial Storm of Air-Sand Floats Coal on Its Upper Surface, Leaving Refuse to Sink

By Thomas Fraser* and H. F. Yancey†

THE air-sand process is one in which inferior material is removed from coal by means of a body of dry sand artificially fluidized and maintained in that condition by a continuous stream of air bubbles flowing through the sand body. By proper regulation of the rate of air flow, this fluid air-sand body may be maintained at such a density that coal will float near its surface and the refuse, which is heavier, will sink through the sand to the bottom of the container. This separation is a float-and-sink operation similar to the separation of wood chips and stones in water; the one floats and the other sinks, irrespective of the size of the pieces.

This was the objective sought in the development of this method of cleaning coal—a dry process which requires no preliminary sizing. Fig. 1 shows the cast-iron cell used for testing at the Central District Experiment Station of the Bureau of Mines, Urbana, Ill. This consisted of two castings: a rectangular box

12 in. square in cross section and 18 in. tall, open at both ends and flanged on the bottom and a cubical box also 12 in. square inside, with a closed bottom and flanged top. A porous diaphragm is bolted between the flanged ends of the two castings.

The upper part of the cell above the diaphragm is filled with river sand that has been passed through a 20-mesh screen without the removal of the dust. Air under suitable pressure is admitted to the lower part of the cell below the diaphragm, passes through the diaphragm and bubbles up through the sand, distending the mass and throwing the sand particles into motion.

Obviously the diaphragm is the essential feature of this machine. It must act as an air-diffusing medium to distribute the rising air bubbles evenly over the cross section of the cell so as to agitate the sand body uniformly and produce thereby an homogeneous fluid. For this purpose perforated metal plates, Filtros plates and porous concrete slabs have been used successfully. The last named have been given preference in the experimental work because of facility with which special shapes may be made.

The sand bath, when correctly adjusted, "boils" uniformly on the surface and feels much like a fluid; it is easily penetrated and stirred with the hand, and offers little resistance. When ordinary silica sand is used, just enough air to produce a free flow makes an air-sand bath of about 1.45 specific gravity, as indicated by a spindle hydrometer. Coal will float in this medium

in the upper part, but almost entirely submerged. Refuse material such as shale and pyrite sink to the bottom of the cell and accumulate on the diaphragm. An accumulation of coarse material 2 or 3 in. deep apparently does not interfere with the operation but helps to break up and distribute the air; a thicker bed is disadvantageous.

To obtain a specific gravity of 1.45 with silica sand, a pressure equal to the weight of 1½ to 3 in. of mercury is required in the air chamber. This depends primarily upon the porosity of the diffusing medium. No measurements of air consumption

have been made, but the volume used is comparatively small; the function of the air is to agitate and distend the sand body, not to lift the coal load by impact. No irregularity of flow is observed in the sand chamber as might be expected on a cell of such shape. This is probably because of the small quantity of air used and the low velocity through the diaphragm.

The simple apparatus by which the operation of the process may be demonstrated, can be assembled in a few minutes in any laboratory where the material is available. It consists of a 3-in. porcelain Büchner funnel, and an open glass cylinder of approximately the same diameter as the funnel and 12 in. or more long. The two are fitted together, sealed by wrapping the joint with electrician's tape and supported by an upright ringstand. Sand is placed in the cylinder, and air is introduced through the stem of the funnel. Any source of air the pressure of which is fairly constant, is suitable. In a small tube of this kind only a small quantity of air should be admitted the admission being controlled by the "cracking" of the valve.

As an example of the separation made by the method Table I gives the results of a test on coal from No. 6 bed in central Illinois. The coal was of nut size (2 by 3 in. round-hole screen) and was taken from a 10-ton sample collected at the mine. It contained the natural proportion of impurities, as it had not passed over the picking table in the tippie. The cast-iron cell shown in Fig. 1 was used to make the separation.

Table I—Results of Air-Sand Cleaning Test

Products	Weight, Pounds	Yield, per Cent	Ash, per Cent	Sulphur, per Cent
Raw coal	62.3	100.0	14.3	6.09
Cleaned coal	54.4	87.3	9.9	4.57
Refuse	7.9	12.7	44.9	16.56

The results of this trial are very satisfactory, as may be judged by comparing them with a test made of a much larger but identical sample of the same lot of nut coal in a two-compartment jig. In the jig test 82.6 per cent of washed coal was recovered containing 10.3 per cent ash. A specific-gravity analysis, made by the

This article was presented at the New York meeting, American Institute of Mining & Metallurgical Engineers, Feb. 16.

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†Associate chemical engineer, U. S. Bureau of Mines, Seattle, Wash.

float-and-sink method on another part of the 10-ton sample used in all the work, showed it to contain 90.4 per cent of float coal with 9.9 per cent ash, the same quantity of ash as that of the cleaned coal obtained in the air-sand test. The efficiency of the separation between coal and refuse in the air-sand cell is, therefore, 87.3, which is the yield of cleaned coal, divided by 90.4, the yield theoretically possible under ideal conditions, or 96.6 per cent. The ash content of the refuse obtained may appear on casual inspection to be too low, but considering that nut coal 2x3 in. was treated, and that the refuse contained about 30 per cent of pyrite, which loses about one-third of its weight on incineration, the 44.9 per cent ash in the refuse is quite acceptable.

In the development work on this problem, only the cast-iron cell shown in Fig. 1 was used. A gravity method suitable for the removal of refuse from the machine was developed. A bar screen made of sheet iron was placed in the cell just above the porous diaphragm and inclined at an angle of 45 deg. to it. One side rested on the diaphragm.

The slope was continued outside the cell by making an opening through the side of the diaphragm frame, constructing a special diaphragm of porous concrete, and providing an outside chute that reached to the same level as the bottom of the air chamber. When in operation, the opening of this chute is sealed with sand so that it does not act as a bypass for air. This arrangement provided a satisfactory means for removing refuse with no interference with, or alteration of, the air-sand medium within the cell.

The transition of this process from the laboratory test unit to regular plant operation will require the solution of various problems. Trials with various laboratory units have reached a stage of development wherein the main factors governing the separation between coal and refuse by the air-sand process have been satisfactorily controlled, and apparently no problems incapable of solution stand in the way of full-scale application.

Fig. 2 shows a cross section of the arrangement for a proposed general plant using this process. The operation is more or less self-evident. The air-sand medium is produced with 20-mesh river sand in the cell, which might be from 8 to 24 in. deep. Air is supplied by a high-pressure blower through the expanding approach to the diffusing slab that forms the bottom of the air-sand cell.

This slab is inclined to one side to facilitate the discharge of refuse and avoid the use of a moving element for that purpose. The tendency of the rising air to favor the high side is compensated by increasing the resistance of that part of the diffusing medium. Refuse is swept out by a continuous slow movement of sand over the cell bottom and out through the refuse chute as shown. The rate of discharge is controlled by the outside revolving gate.

Coal is fed to the upper part of the air-sand cell, dragged across it and discharged by an endless chain

scraper line. Discharge of coal is also aided by continuous rise and overflow of sand, any excess over the quantity removed by the slate gate being supplied from the sand storage tank. A stirring device to promote uniform agitation of the sand may be found advisable

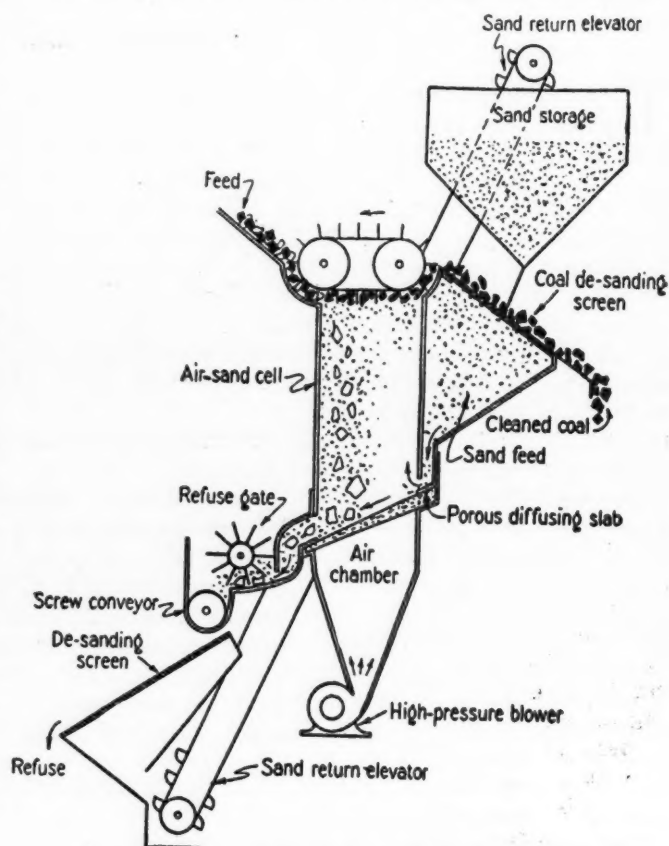


Fig. 2—Proposed Plant for Air-Sand Process

This shows plan for supplying sand to the air-sand cell, floating the coal on the sand, removing it by a conveyor, de-sanding it, removing the refuse and collecting what sand passes out of the refuse gate.

in a large-scale operation, although it has not been necessary in the experimental cell.

Heavy refuse such as shale, pyrite and bone particles drop out of the coal stream as it traverses the separating cell, and fall through the sand to the inclined cell bottom. Cleaned coal and overflow sand pass immediately over a de-sanding screen, and the sand returns directly to the sand feed chute. The refuse, which carries a larger circulating sand load, is gathered by a screw or drag conveyor to a central point where it is de-sanded by a screen and the sand is returned to the general sand storage bin by an elevator.

Suction dust hoods are not shown in Fig. 2, but will probably have to be placed over the separators and screens in order to keep the plant clean. However, on account of the small quantity of air used to agitate the sand, the air load on the dust-collecting system will not be heavy.

The only preparation that the feed will require is de-dusting or removal of fine material of the size of the sand or finer. Obviously the cleaned coal could not be de-sanded by a simple screening operation if the contained coal were as fine as the sand. Bypassing of the fines is coming to be almost standard practice at many coal-mining plants.

It is expected that the coal dust produced by attrition in the system after preliminary de-dusting of the feed will be taken up by the dust-collecting system, as there is a classifying action at the suction hood favoring the

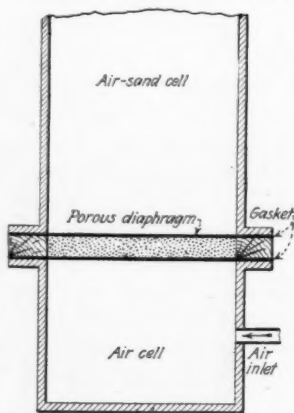


Fig. 1—Air-Sand Coal Cleaner

Apparatus as used at Central District Experiment Station, U. S. Bureau of Mines, Urbana, Ill.

induction of the light coal particles; the position of the hood and direction of air flow at the top of the separating chamber especially favor this action.

Degradation of the sand, if appreciable, may form a dust that will be difficult to separate from the coal, but it is expected that the quantity will be so small that it can be absorbed by the coal dust product without contamination of the latter. In tests made with new sands containing slime, it has been observed that the dust that is finer than desired for the air-sand bath is carried away by the air so that after a few minutes operation the sand mass becomes free of dust.

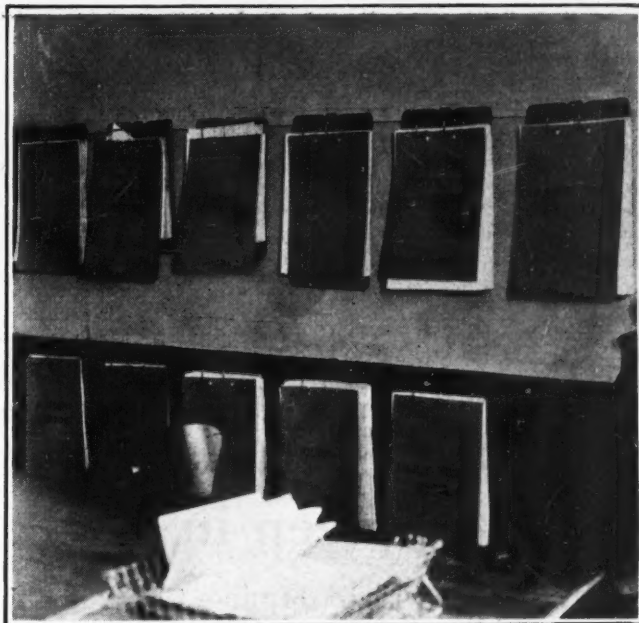
The objectives sought in the design of a plant for cleaning coal by this method should be simplicity and low cost, in order to take full benefit of the three outstanding advantages of the process, which are: (1) dry operation; (2) positive and immediate float-and-sink separation; (3) the treatment of an unsized feed.

It may be added that the air-sand process was developed to its present stage by the Bureau of Mines, but it is patented (U. S. Patent No. 1,534,846, April 21, 1925, a process of separating loosely mixed materials), and the patent is privately owned.

Drill Rig Mounted on Auto Truck Does Fast Work

In stripping operations where the overburden must be drilled and shot before it can be removed, rapidity in moving the drill rig from one hole to another is important. The accompanying illustration shows the drill rig which W. N. Chandler, Jr., of Tulsa, Okla., placed on the body of an old White truck. The drill rig proper is operated by a kerosene engine.

With this outfit Chandler and his father are now sinking shotholes on contract for the Hinde Mountain Coal Co. Such shotholes are drilled 45 ft. deep and are placed 30 ft. apart each way. They are shot ten at a time. There is no loss of time in starting a new hole as it is merely necessary to drive the truck with the drill equipment from one hole location to the next. The speed and convenience of this method are important factors in this class of work and it is said that Chandler and his automobile outfit are much in demand. The equipment may also be employed in drilling oil or other wells where the depth does not exceed 800 to 1,000 ft. It is most advantageous, however, in work on shallow drillholes where frequent moves are necessary.

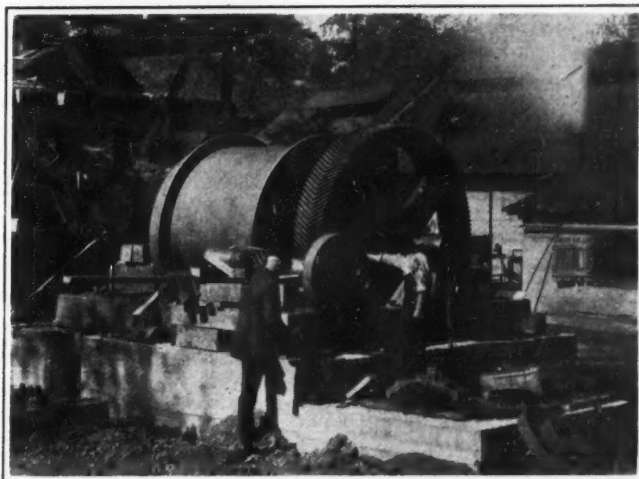
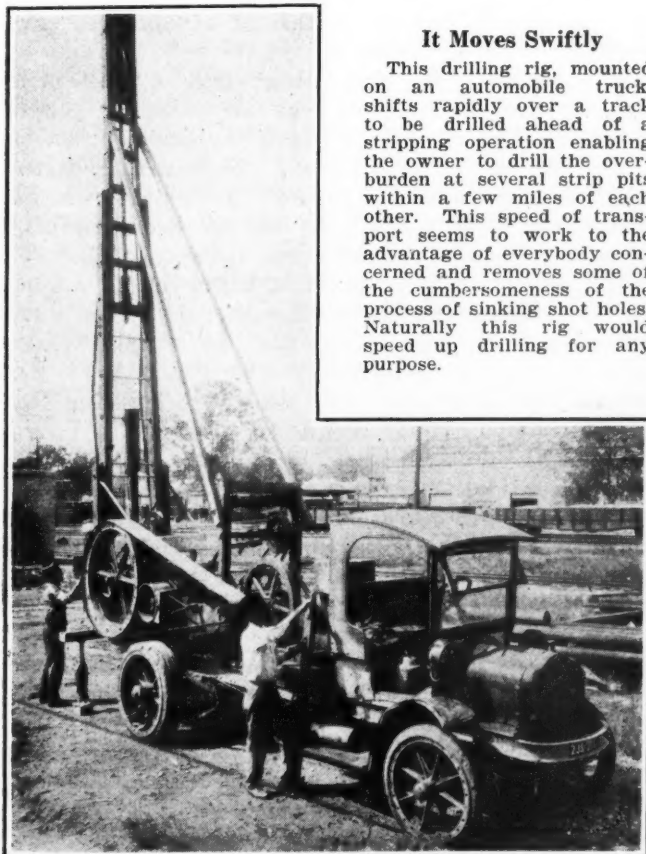


Cost Keeping—at a "Super's" Desk

Orderly detailed records of mine operation costs from day to day may be computed and filed in such manner as this. The "super" is so well acquainted with each phase of his operation that a vast array of figures may mean something to him. But if the most is to be derived from them, through his own studies and those of his superiors, the figures must be grouped and condensed on graphic charts.

It Moves Swiftly

This drilling rig, mounted on an automobile truck, shifts rapidly over a track to be drilled ahead of a stripping operation enabling the owner to drill the overburden at several strip pits within a few miles of each other. This speed of transport seems to work to the advantage of everybody concerned and removes some of the cumbersomeness of the process of sinking shot holes. Naturally this rig would speed up drilling for any purpose.



Big Alabama Hoist Under Construction

This is said to be the largest electric hoist in the Alabama coal field south of Birmingham. It has been installed by the Montevallo Coal Mining Co., at Aldrich, to replace the steam hoist now used to pull cars up the slope. The new hoist, which is driven by an 800-hp., 2,300-volt wound-rotor induction motor, will wind 3,600 ft. of rope at a speed of 1,250 ft. per minute. B. C. Moore (left), master mechanic and outside foreman, is discussing with C. H. Brill, the mine electrician, some point regarding the installation.



Rocky Mountain Men for Three Long Days Steep in Their Safety Problems

Concentrated Mining Conceded to Enhance Safety but Canvas Tubing Is Warmly Attacked—Harrington Condemns Open Switches—Stray Currents a Hazard—At Acme Accidents Decreased with Mechanicalization

MEATY and intensely interesting discussions of coal-mine problems marked the twenty-second meeting of the Rocky Mountain Coal Mining Institute at Denver, Colo., Feb. 23, 24 and 25. The dangers attending the use of electricity underground and what can be done to offset them, the ventilation of workings opened under modern mining methods, safe shot-firing and other subjects were treated at length during the three days of technical sessions and "good time gatherings." The meeting brought 300 members from the four mountain states of Colorado, Wyoming, New Mexico and Utah. This was the largest attendance the Institute has ever assembled at any of its conclaves.

After members had renewed acquaintance President John B. Marks called the first morning meeting to order. The question of a division of the membership into active and associate members was discussed and later referred to a committee for study. E. H. Weitzel of the Colorado Fuel and Iron Co. and W. F. Murray of the Coal Leasing Division of the U. S. Geological Survey as founders of the Institute were elected life members. The convention then, upon the suggestion of George B. Pryde of the Union Pacific Coal Co. and James Dalrymple, Colorado chief mine inspector, decided to change its official emblem from a replica of

the old miner's oil lamp to that of an approved magnetically locked safety lamp.

A paper entitled "Spiralizing Plant of the Spring Canyon Coal Co." by George A. Murphy, general superintendent of this company at Spring Canyon, Utah, was read by Mr. Gibson. This plant is one of only two installations of the sort in the West. It was installed to clean the smaller coal of the refuse made by a 2-in. bony band near the bottom of the seam which necessarily gets mixed with the coal in mining. By its use approximately 90 per cent of the refuse is separated and the ash reduced from an original content of 8 per cent to approximately 5 per cent.

The plant is a 5-unit spiral capable of handling from 35 to 40 tons per hour of pea coal (through 1½ in. and over ¾ in.). Four of these units handle coal from the distributor and a fifth a re-spiralizer handling the "middlings." In operation it was found that after the surfaces of the spiralizer flights and chutes attained the necessary smoothness from wear, the chief difficulty encountered was from wet coal which tends to clog the chutes. One attendant runs the plant. Mr. Murphy considers the installation now a success.

Discussion developed the fact that the spiralizing plant proper cost about \$50,000 when it was built with the new tippie of the Spring Canyon Coal Co. In a country where water is not readily available such a spiralizing plant takes the place of a washery.

C. H. Trik of the Jeffrey Manufacturing Co. next

The panorama at the top of the page shows the members of the Rocky Mountain Coal Mining Institute lined up before the photographer. The man on the bottom step with his hands clasped on a perfectly good Fedora and his feet spread to assure entire stability is Horace Moses, the new president.



presented a paper on the "Ventilation of Working Faces Under the Various Systems of Concentrated Mining." Nobody questioned Mr. Trik's conclusion that concentrated systems of mining offer opportunity for much better ventilation of working faces than do the old scattered system of workings but sharp exception was taken to his advocacy of the use of canvas tubing and auxiliary blowers for the ventilation of narrow work preliminary to the mining of blocks.

LINE BRATTICE VS. BLOWERS

Mr. Trik declared that there were two methods of sending air to the face of dead ends: one by the use of line brattices and the other by auxiliary blowers with canvas tubing. Blowers and tubing permit the ventilation of headings 100 to 1,000 ft. long and when such headings are finally connected some operators move the blowers up to the face and use them to blow fresh air along the face. Concentrated systems of mining, if successful, he said, show a reduction in cost of production per ton over former systems. Any additional saving in cost of ventilation is just so much velvet and the mine operator may expect, if his permanent airways are kept clean and wide, to have a decreased cost of total ventilation because of lowered mine resistance and consequently a decreased use of power.

Inspector Dalrymple said that thus far in concentrated systems of mining the main consideration seemed to be cost reduction with no thought of safety. It seemed to him little short of murder in a gaseous mine to place electrically driven blowers along the working faces. In his opinion these blowers presented a serious hazard when used to ventilate headings 200 ft. or more in length, due to recirculation. He said they would not be allowed in a gaseous mine in Colorado. He also opposed carrying air such distances by line brattice.

William Littlejohn of the Utah Fuel Co. and James Struthers and G. D. Jones of the Victor American Fuel Co. also felt such auxiliary fans to be a distinct hazard.

E. H. Denny of the U. S. Bureau of Mines said that the Bureau considered that the use of such electric-driven fans whether intermittently or for the full 24 hours of a day involved grave hazards from air recirculation if fans were not truly placed in intake air. They also created a certain amount of fire hazard. He said that the Bureau accordingly had withdrawn its approval of the proposed American Engineering Standards Committee Code. Anemometer readings showed measurable velocities in places ventilated by line brattice only for 50 to 75 ft. from the outer end of the brattice.

Daniel Harrington declared that auxiliary fans had no place in a coal mine and cited cases to prove the hazard from gas ignition involved in their use. He declared inadequate ventilation from a health standpoint was also possible due to a recharging of the air. He had found a working place supposedly ventilated by fan so deficient in oxygen that a match would not burn and men could not work properly.

Glenn Knox of the Gunn-Quealy Coal Co., Rock Springs, Wyo., discussed the concentrated system of mining with conveyors as described in Oct. 15, 1925, issue of *Coal Age*. He pointed out that by driving three entries in this system no use of blowers or of narrow work without crosscuts was necessary.

CROSSCUTS SUITED TO ANY METHOD

Mr. Harrington voiced an apparently general sentiment when he said that it was possible to work any of the concentrated systems which he had seen or heard of without violating the law or safety practice with reference to crosscuts, and the elimination of crosscuts and consequent use of blowers was merely a cost-saving scheme not vital to the systems themselves.

At the Wednesday morning meeting, discussion of Mr. Trik's paper of the previous day on "Ventilation of Working Faces Under the Various Systems of Concentrated Mining" was resumed. Mr. Trik pointed out that the manufacturers of the small auxiliary fans

could furnish with them a right angle connection which would permit of the fan being placed in fresh air. He thought that the installation of these fans should not be necessarily condemned just because the mine officials did not place them in the proper position.

Mr. Harrington's paper on "Danger from Electricity in Coal Mines" was then taken up and occupied the attention of the Institute for the balance of the morning and a good part of the afternoon session. Mr. Harrington declared that electricity was a growing source of danger as a cause of mine explosions and that accidents from contact with exposed wiring and the like were only a small portion of the sum total properly attributable to it.

He said that, over a 25-year period, 30 disasters and approximately 100 serious mine fires involving a total loss of 1,660 lives have been caused by electricity. In 1924 and 1925 eleven out of the twenty coal mine disasters were of electrical origin. All electrical equipment used in coal mines has inherent dangers. Even 110 volts alternating current has killed men by contact. Explosions have been caused by the rupture of pick-proof cable in a coal dust cloud, by trolley arc and gas, by incandescent globe, by mining machines at the face, by machine nips, by pump and hoist motors, by electric drill, by open switch, by booster fan, by face conveyor motor and by stray currents, all in the presence of gas, as well as by trolley line and black powder. New intensive systems of mining with the increased use of loading, scraping and conveying machinery at or near working faces means a heavy increase in the amount of electrical equipment underground.

Mr. Harrington stated that continued and increased use of electricity in coal mines is a necessity and therefore that the problem is to formulate and make use of safe electrical underground practice. He then raised thirty-five specific questions relating to underground electrical practice with his viewpoint on these.

D. C. McKeehan, electrical engineer of the Union Pacific Coal Co. whose new electrical and other safety standards have been published recently in *Coal Age*, discussed Mr. Harrington's questions in detail. He favored the use, for power lines, of lead-covered, armored cable properly grounded supported on a steel messenger wire. He would keep these out of returns of gaseous mines. He understood that a receptacle with plug is now in use by one company to replace the usual "nips" for attachment of machine cables to power lines.

NO OPEN-TYPE SWITCH SAFE

He is of the opinion that no open type of switch is safe in any mine and that in nongaseous mines a safety type with quick-make-and-break blades, the box of which cannot be opened except when switch is out, should be suitable. In gaseous mines oil circuit breaker switches should be used.

Mr. Harrington brought up the danger of stray currents in electrical blasting. Mr. McKeehan thought the use of rubber-clad shooting wire and the keeping of lead wires short circuited and away from coal and rock would minimize premature shots. Mr. Harrington and Mr. McKeehan both believed that new systems of mining presented an extra electrical hazard of gas ignition and the latter advocated the use of totally enclosed motors. They also favored keeping of mining machines and trolley line voltages down to 250 volts d.c. and 220 volts a.c. Frequent inspections of underground elec-

trical equipment by competent persons are desirable. While there is a considerable variety of approved electrical equipment available, careful supervision and inspection are essential to see that it remains in a safe condition.

C. B. Officer of the Sullivan Machinery Co. submitted written discussion of Mr. Harrington's paper. He thought that with the concentration of mine work it was entirely possible for mines to make their electrical installations more carefully and more permanently. He believed that under certain conditions an open type electrical switch was safe for mine use. He thought that there was little choice as to safety between direct and alternating current. He knew of many mines using pressures of 500 volts or more without, in his opinion, increased hazard, as men paid more respect to such higher voltage installations and were more careful around it.

UNDERGROUND WIRES REMOVED

Regarding storage battery equipment in mines he cited an eastern mine in which all underground wires have been removed and all electrical equipment operated by storage batteries, every part of the installation being of approved type. A careful study would have to be made in a gaseous mine before the feasibility of replacing wiring by storage batteries for the transporting of electrical energy can be decided, he said. In mines using or contemplating mechanical loading the placement of loading machine storage battery track would be a difficult problem.

Mr. Jones of the General Electric Co. thought Mr. Harrington's paper very much overdrawn and that the dangers cited were more attributable to carelessness than to electricity. Suitable electrical equipment was on the market and rules for good practice in its installation had been formulated. He believed that some of the accidents for which electricity was blamed were really from other causes.

The discussion of Mr. Harrington's questions by L. C. Ilsley, electrical engineer of the Bureau of Mines, was read by K. H. Marshall of the Bureau. In the main, Mr. Ilsley's views as to safe practice coincided with those of the previous speakers. He believed that in general power lines should be installed in intake entries and that rooms should not have power lines in them other than the properly designed trailing cables. Greater safety could be obtained by the use of junction boxes in place of "nips" or by the use of storage battery power trucks but with "nips" designed so that there was no likelihood of electric shock when attaching them seemed to have no special hazard.

Neither weatherproof wire nor rubber-covered wire should be relied upon in mines to prevent shock; all conductors except metallic armored coverings should be given the same respect as bare wire. Poor rail bonding is one of the greatest causes of stray electric currents in mines. Unless the amount of the stray current exceeds $\frac{1}{2}$ of an ampere there will be little danger of premature firing of electric detonators; if stray currents of dangerous amperage are present the only remedy would be the hunting out of their source and the improvement of the return.

He believed that multiple shot-firing has a tendency to weaken the roof and that gas liberated by one shot might be ignited by a second shot. The danger from missed shots was reduced. Incidentally the Bureau of

Mines knows of no multiple-shot electric battery of the magneto type which cannot ignite gas. The ordinary mine telephone can ignite gas through the ringer. He said two types of loading machine have already been approved by the Bureau of Mines as well as a large variety of electrical equipment.

Mr. Littlejohn thought that the dangers of power lines in intakes in the presence of coal dust overbalanced those of such installations in returns. He also thought the dangers from blowing up of long trailing cables in rooms were greater than those from the use of machine wires in rooms.

Edward Bottomley's paper on "Mechanical Loading at Acme, Wyoming" pointed out some of the difficulties and changes necessary when such a system of loading is installed. Results now being secured from production, cost, and lump coal standpoints were highly satisfactory. The mechanizing of the 3,500 ton Acme mine was described in the Jan. 28, 1926, issue of *Coal Age*.

Discussion developed that the good results obtained in this mine by the Goodman shoveling machine and Joy loaders were in 11 ft. of coal with coal roof and bottom and that no timbering was required in the working places. In the nearby mine of the Hotchkiss Coal Co. similar mechanical loading was being employed. To secure more lump in mechanical loading a 7-ft. undercut had been made. The mining machine was then set up on ties and a second 5-ft. cut made. When the slack from this double cutting was removed the effect of the old-time snubbing practice was secured and in 13-ft. coal with 7 holes in a 26-ft. room lump coal production was increased 12 per cent. There also was a saving of one-third in powder consumption as a result of careful supervision.

Mr. Bottomley stated that accidents per ton had been materially reduced in the Acme mine since mechanical loading was introduced.

Mr. Johnson of the Coloder Co. believed that mechanical loaders offered much opportunity for accident reduction on a man-day tonnage basis. He described the use of a breast type cutting machine mounted on a turret truck and cutting at an angle with the horizontal to produce a snubbing effect. A shot in the bottom below the beginning of the cut resulted in the desired snubbing.

BIG CARS HELP HAND LOADING

Mr. Struthers believed that in the figures presented mechanical loaders were given none the worst of it, and that if cars were rebuilt to increase the capacity to three or more tons for the benefit of the machines that a similar enlargement might work to the advantage of hand loading. Mr. Dalrymple observed that the dependent shots involved in the shooting system and the lack of timber would be a violation of the mining law in Colorado. Although Mr. Bottomley found that an increased mine car supply or the equivalent in larger capacity was desirable, Mr. Knox found at Sweetwater, Wyo., that the concentration of working territory made fewer cars necessary.

A letter from F. N. Cameron, general manager of the Utah Fuel Co., was read, following Mr. Bottomley's paper, enclosing a description by Superintendent Jones of the new system of shooting and gas inspection at the three Castlegate mines. For nine months the fire bosses in the Castlegate mines have been taking charge of all shooting and gas inspections.

Under this system the fire bosses meet at the lamp room at 9 p.m. to prepare their lamps and receive their powder and caps. The foreman thus knows before he goes to bed that his fire bosses are on the job. The fire bosses have the opportunity and sufficient time, if the number of shots they have to handle is kept within reason, to examine the places before and after shooting, giving them more time and smaller districts to cover in the most important part of their work—the final examination of the mine before the men start in the morning.

By this system there is no powder or caps in the mine during the day shift. Powder and caps are handled only by certified men and there is an absolute check on all explosives. Every hole is loaded and tamped by qualified men and the fire bosses know, before they leave the mine for the electrical shot-firing from the surface, the condition of each place to be shot. After a little time these men know how to use the powder so as to get the maximum proportion of lump or maximum tonnage.

CAP DISTRIBUTORS REALLY SALESMEN

In nearly all coal mines now there are the so-called shot inspectors whom Mr. Jones thinks could better be termed "cap salesmen" inasmuch as they are merely cap distributors. The system described by Mr. Jones is said to make for real safety and efficiency in the handling of powder.

Average cost of explosives at the three Castlegate mines, subject, Mr. Jones believes, to improvement, is as follows:

Tonnage 45,229		Cost per ton Cents	
Powder	\$1,906.25	4.2	
Caps	436.56	1.0	
Labor	1,401.45	3.1	
	\$3,744.26	8.3	
		No. 1 mine	No. 2 mine
Tons per lb. of powder.....	9.33	5.47	4.31
Lb. powder per shot.....	.724	1.3	1.08

Mr. McLeod, chief mine inspector of Wyoming, thought there was possibility of fire boss passing up an unshot place on his last inspection under this system chalking it on his first round. Mr. Dyer of the coal leasing division of the U. S. Geological Survey and Mr. Harrington both thought the new system a good one. Mr. Dalrymple and Mr. Harrington, however, both took a crack at the system now in use at Castlegate and in other Utah and Colorado mines of paying fire bosses, upon whom the safety of every man in the mine depended, on a day basis.

At the Wednesday evening banquet the 600 guests forgot coal mine hazards and costs when confronted with the "Parisian Follies" by the Rocky Musicoal Players. A black face cast under the direction of Mr. Veatch and Mr. Krippner caroled and jested in an orange grove on the banks of "Bitter Creek, Wyo." Walter Tripp as "Private Sambo Bottomley" with a monologue on the late war was featured. Pliny F. Sharp officiated most efficiently as toastmaster. The principal speaker was the Rev. Wilson P. Ard of Denver whose eloquent address "The Challenge of a Great Adventure" held the undivided interest of his audience.

At the meeting of Thursday morning C. M. Billington criticized the new system of combined fire bossing and shot-firing described the previous day, declaring that it was inadequate because of the absence of fire bosses in the mine during the day shift. In case of a

disaster, he said, the result would be similar to that of a shipwreck in which captain and crew escaped by boats but the passengers lost their lives. Daniel Harrington replied that the Castlegate mines had foremen and assistants on duty and that in general, in his opinion, there were in any event too many flame safety lamps in a mine on the day shift.

T. H. Butler, of the Union Pacific Coal Co., presented the suggested changes in the report of the Safety Committee of the Institute together with other additions suggested by George W. Pryde, chairman. Discussion at the afternoon meeting developed that some of the changes in the report did not meet the approval of various members of the safety committee itself. The recommendations that 500 volts direct-current be barred from underground installations; that mines having traces of gas be termed gaseous; that permissible powder and electric detonators be used exclusively in gaseous mines; that open lights be barred from all underground workings; that no dynamite be used in coal mines; these

recommendations were among those causing little or no discussion. The recommendations that no gas accumulation be moved during the working shift aroused much question as to what constituted a dangerous gas accumulation; likewise a proposal that all men working about underground wiring wear rubber shoes brought criticism of the value of such shoes, rubber gloves, rubber mats, etc., as protective devices. The proposed changes in the safety committee report were finally referred back to the committee for further study and discussion at the next meeting.

The final business of the session consisted in the election of officers for the year 1926. The new officers of the institute are as follows:

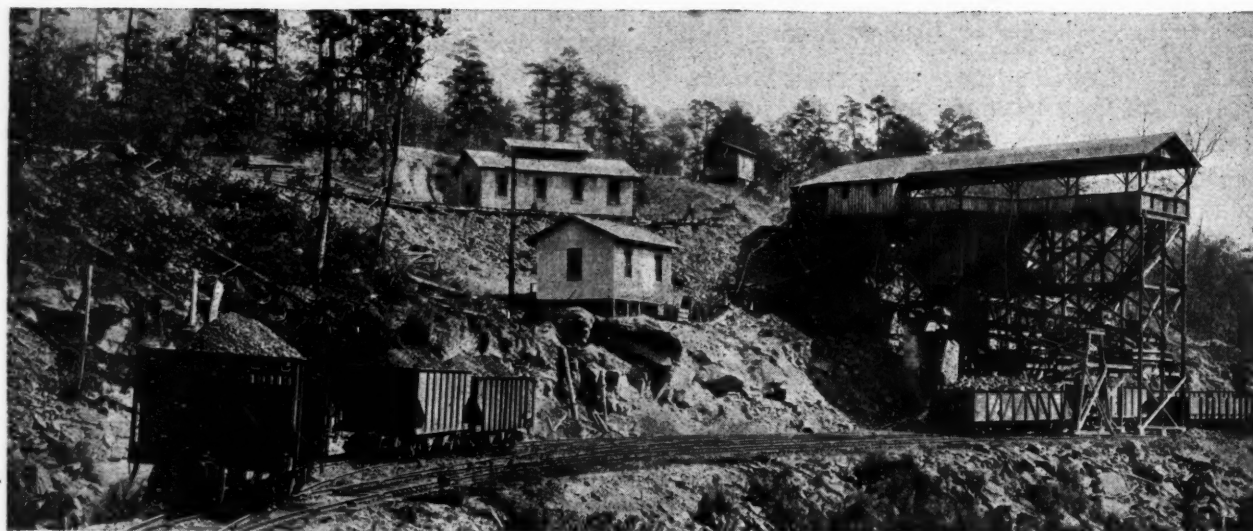
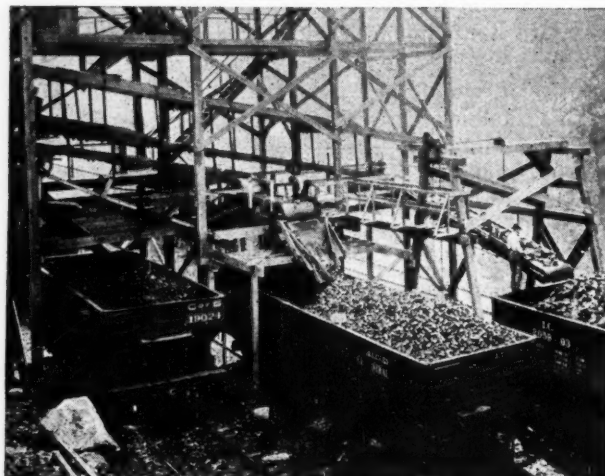
President—Horace Moses, general manager, Gallup American Coal Co., Gamerco, N. M.

Vice-Presidents—Robert L. Hair, Colorado; Virgil R. McKnight, New Mexico; A. E. Gibson, Utah; Thomas Foster, Wyoming.

Secretary-Treasurer—Benedict Shubart, Colorado.

Executive Committee—J. B. Dick and C. M. Billington, Colorado; W. C. Holman and Robert Wyper, New Mexico; R. R. Kirkpatrick and George Schultz, Utah; Edward Bottomley and Quince Rice, Wyoming.

Tipple Has Belts on Picking Tables and Loading Boom



No. 3 Mine, Alabama Fuel & Iron Co., in the Cahaba Field, at Acton, Ala.

The workings of this mine are in the Helena seam, and the coal is about 66 in. thick. Contrary to the impression conveyed by the name, the coal mined by this company in the Cahaba field is not utilized in the iron-and-steel industry. Of the 1,250,000 tons production

about 1,000,000 tons goes for steam purposes, mostly to railway and steamship companies, and about 250,000 to domestic use. In the upper left-hand corner is the mine mouth and exterior slope. The coal cars are hauled up the slope in five-car trips by a single rope hoist. In the

upper right-hand corner and in the bottom illustration will be found two views of the tipples. This structure was built about two years ago. It utilizes belts for the picking tables and loading boom. The smaller sizes are shipped to some of the central washeries of the company.

Book Reviews

What Rock-Dusting Costs

Steady progress in the movement for the rock-dusting of bituminous coal mines as a means of preventing or limiting disastrous coal dust explosions is indicated as the result of an investigation conducted jointly by the Bureau of Mines of the Department of Commerce and Carnegie Institute of Technology, Pittsburgh, Pa. and recorded in Bulletin 18, Coal Mining Investigation Series, entitled "Methods and Costs of Rock-Dusting Bituminous Coal Mines." Whereas at the beginning of 1924 few coal mining companies operating in the United States had done thorough rock-dusting, by September, 1925, 102 companies in 12 states had rock-dusted 211 miles. The tonnage annually produced by these rock-dusted mines according to the bulletin, represents approximately 11 per cent of the annual production of all bituminous mines in the United States.

Rock dust has been found useful not only in preventing explosions but in subduing mine fires. Some mine operators are storing material at strategic points for fire fighting.

LIMESTONE DUST PURCHASED

Limestone and shale are used almost exclusively for rock-dusting. Most of the purchased material is limestone, but shale from the mine roof, in which the free silica is less than 25 per cent, is used by the mine operator who has equipment to pulverize it at the mine. There are suitable materials such as gypsum and dolomite, also adobe clay and talc, where these contain less than 25 per cent free silica. The cost of rock dust, sacked, and unloaded, including freight, at the mine has ranged from \$4.85 to \$7.70 per ton, with an average of about \$6. The cost of rock dust, chiefly shale dust, mined and pulverized at the mine, has ranged from \$2.60 to \$5.50 per ton, with an average of about \$3.50.

Most of the rock dust used is purchased, but a few coal companies have their own pulverizing plants. Five types of pulverizers have been used for this work. These cost from \$2,000 to \$5,800 and pulverize 1,500 to 3,500 lb. of rock per hour at costs varying from \$2.09 to \$4.96 per ton.

There are two classes of rock-dust distributors—fixed discharge nozzle and flexible discharge nozzle. These machines must be adaptable to mine conditions, apply an effective coating to the roof, ribs, and floor, and be easy to operate. The machines cost from \$370 to \$4,800, and can move from 1,700 to 4,200 ft. per hour. Commercial machines distribute 1.28 to 3.5 lb. of dust per linear foot of travel.

DON'T OMIT BARRIERS

Rock-dusting, say the authors, C. W. Owings, assistant coal-mining engineer, U. S. Bureau of Mines, and C. H. Dodge, research fellow, Carnegie Institute of Technology, should be supplemented with effectively designed barriers, which are considered to be a secondary line of defense. Mines should be divided into zones and the barriers placed at strategic points. V-trough and concentrated barriers erected in the mine in sets of from 10 to 24 have cost from \$1.75 to \$5.70 per trough. However, experienced investigators of the Bureau consider that many V-trough barriers that have been erected in mines do not carry enough rock dust to extinguish an explosion unless supported by generalized rock-dusting in the vicinity. Concentrated barriers have cost \$64.50 for a wooden barrier and \$74.50 when of steel construction.

Further information is given in Bulletin 18, Coal-Mining Investigations series, "Methods and Costs of Rock-Dusting Bituminous Coal Mines." Copies of this bulletin may be obtained from Carnegie Institute of Technology, Pittsburgh, Pa., at a price of \$1.50.

Making the Orsat Accurate

From an extremely simple rough-and-ready apparatus the Orsat is becoming rapidly an instrument both elaborate and accurate. It is also widening its sphere of usefulness. But without all this elaboration and accuracy it will serve many useful purposes, and perhaps only a few will have to use the exact methods that A. C. Fieldner, G. W. Jones and W. F. Holbrook describe in Technical Paper 320, of the U. S. Bureau of Mines, entitled "The Bureau of

Mines' Orsat Apparatus for Gas Analysis."

The Orsat is operated by combustion and therefore there is a change in temperature and pressure to be corrected or eliminated. The water-vapor content changes, and the gases are dissolved in part by the confining liquid. Then there is the capillary error of the apparatus. "A change of 2.7 deg. C. during a determination makes a difference of about 1 per cent in the volume. As a gas analysis" say the authors "is actually a series of observations of changes of volume during treatment by different absorbents, a temperature change may indicate the presence of certain constituents which in reality are not present."

Early History of D. & H. Co.

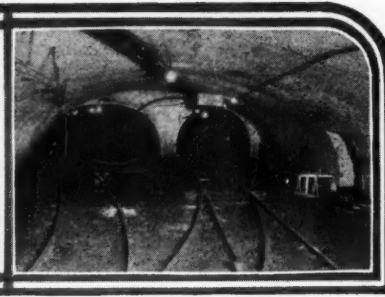
To the coal-mining man the book entitled "A Century of Progress" published by the Delaware & Hudson Co. will be a great disappointment. He will feel that the coal industry on which the progress and success of the transportation department of the company has rested has been given inadequate consideration. Apparently the author, whose name is suppressed, is a railroad man. He has written a conservative but intensely interesting book—on the history of a railroad. Rarely does he have anything to say as to the mines or as to coal selling.

ROMANCE OF SELLING

In the early days the selling of coal was a romantic enterprise. The coal company did not elbow itself into other coal markets, but it made new ones of its own. Anthracite, when it first came to New York, was regarded as a worthless product fitted for nothing except for filling or ballasting. Gradually it found itself, despite opposition, in places which everybody thought it could never attain. The imagination of the Wurts family, the pioneers in its marketing and in the building of the means of transportation to New York, proved sound, and the scoffers were silenced. To many, today, the new uses for coal being proposed seem as unwise and improbable as those advocated by Jesse Fell, the Delaware & Hudson Canal Co. and the Lackawaxen Coal Mine and Navigation Co. A little of the imagination and pluck of the Wurts family is all that is needed today to make the coal industry progressive instead of stagnant.



Underground Operation



Choosing Tie and Rail Sizes

Ties and rails are the very backbone of any mine track. Not only must the right size of rail be chosen to carry the required load, but ties of adequate size must be used under it, the ties must not be set too far apart, the proper number of spikes should be used, and the rails must be adequately fastened together at the joints. Concerning this phase of mine work James L. Libby says in the *Union Pacific Coal Co. Employees' Magazine*:

Ties furnish the bearing for the rails, as well as a means of fastening and holding the rails in place. Good, well-tamped ties are necessary in maintaining the alignment and grade on track work. It has been proved in practice that hewed ties are more satisfactory than those that are sawed, as the latter have a woolly surface which permits the retention of moisture and encourages fungus growth. Furthermore, in the shaping of the sawed tie the saw cuts in part across the grain and thus weakens the tie, giving it a tendency to split easily.

The dimensions of ties vary according to the importance of the haulage. Long ties give greater stability to the track and do not split as easily. On slopes or any main haulage a 6-in. hewed tie of a length sufficient to give at least a 12-in. projection on either side of the track should be used. The spacing of ties should be 18- to 24-in. centers. In secondary haulage and rooms 4x5-in. sawed ties spaced on 24-in. centers and with an 8- to 12-in. projection give satisfaction because of the short life of these working places.

Steel ties have not been extensively used, but will doubtless be improved in design and their use become more general as the price of wood ties increases. With the panel system of mining, they have the following advantages in room work:

(1) They lower the height of shoveling and increase headroom from 2 to 4 in., (2) they lower the lift in

replacing a car in case of derailment, (3) they keep the track always in proper gage, (4) they enable the miners to lay their own track, and (5) they have long life and can be used over and over again, whereas wooden ties become split and full of holes and consequently are useless.

Their disadvantages are: (1) Their higher initial cost, (2) the fact that they are ill suited for animal haulage because the hoofs of the animal slip on the steel, and (3) the track does not stay on grade or in alignment. The last objection can be remedied by lugs, or turning down the ends of the ties, and then cutting holes in the floor to hold them in place. Much grading or leveling of floor is necessary even when wood ties are used, so that the use of steel ties may not be so objectionable.

In the selection of rails for mine track it is false economy to skimp on first cost; too light a rail, while showing a saving in original outlay, will require an expenditure of the initial saving over and over again in repairs and maintenance. The life of the haulageway, the tonnage to be handled during this life, the type of haulage and the system of mining determine the weight of rail to be used.

Most manufacturers estimate the necessary weight of rail in pounds per yard to be numerically equal to twelve times the weight in tons on each wheel. It is better to use sixteen times this weight, and with four-wheel locomotives this equals four times the weight of the locomotive. Thus a 6-ton locomotive would require a 24-lb. or say a 30-lb. rail; a 10-ton machine a 40-lb. rail and a 15-ton machine would require a 60-lb. rail. A good rule to follow is to use 60-lb. rails on main slopes, 40-lb. rails on planes, 40- to 60-lb. rails on main haulages, 30-lb. rails on ordinary entries and 20-lb. rails in rooms.

If straight face arc wall machines are used, however, the minimum rail weight to employ will be 30 to 40 lb.

Heavy rails are advantageous because of their greater rigidity. They thus retain their alignment and surface grade better, have a long life and a low maintenance cost.

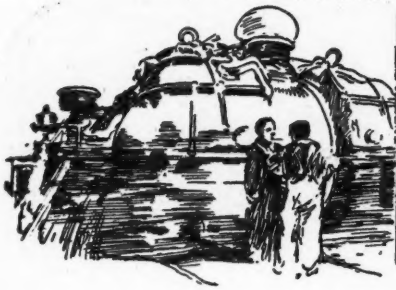
A track is weakest at the joints where the rails have no vertical strength. The joints, therefore, require good fish plates or angle bars. Bolts should be used in all the holes in the angle bars or fish plates and lock washers employed to keep the bolts tight. Angle bars should be used where possible as they give a stiffer joint. Ties should be laid and firmly bedded on each side of the joint so as to give a short suspended joint. When cross ties are insecurely bedded so that track is allowed to move up and down under the wheels, the strongest and most effective fastenings soon become comparatively inoperative.

All rail sections for the different weights used should be standardized; this also applies to the fish plates or angle bars. The drilling of the rails and fish plates or angle bars should all conform to a definite standard made up for the different weights of rail.

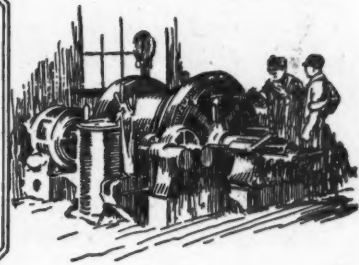
The rails should be fastened to the ties with ample sized spikes; four spikes should be used to each tie. The two spikes on the inside of the track should be driven on one side of the tie, and those on the outside of the track on the other side of the tie, in order to keep the ties in the proper position with reference to the rails. This is necessary to preserve the gage.

Cars Smaller in Gassy Mines

Mine cars must not only be small enough to leave a safe passing width on one side of the roadway but in gassy mines must be of such size that an adequate airway can be provided by a brattice cloth hung so as to take air back from or to the face. This consideration often determines the width of the car where the roof is so poor that the span of the roadway is limited.

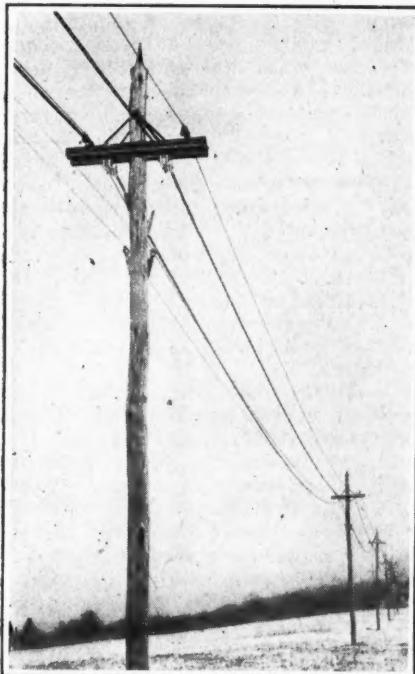


Practical Pointers For Electrical And Mechanical Men



Crossarms Are Installed Upside Down

Standard flat braces installed in the regular way on the under side of a wood crossarm add but little to the strength of the arm. Such braces will buckle under a comparatively slight compression. The chief use



Supports a 1,500,000-Circ.Mil Circuit

With this construction, placing the braces above the crossarm and attaching the heavy cables close to the braces, there is but little tendency to bend or break the arm. The braces are in tension and the arm under compression

of flat braces, as generally installed, is to keep the arm in a horizontal position. It is true that if a heavy load is hung on one end of a cross-arm the brace on the opposite end will be in tension, but the strain tending to break the arm at the center is not lessened by reason of the brace.

These facts were taken into consideration by J. F. MacWilliams, electrical engineer of the Pennsylvania Coal & Coke Corporation, when he was building a pole line to carry two 1,500,000-circ.mil copper cables of a 275-volt direct-current circuit. This line is shown in the accompanying illustration. It extends from a substation to the top of a borehole

entering No. 3 mine, which is located at Ehrenfeld, Pa.

The normal weight of the circuit is close to 1,000 lb. per 100 ft. The cables are hung on the under side of the crossarms and flat braces placed above the arms. The suspension fitting is a Type C mine feeder wire insulator with a plain $\frac{5}{8}$ -in. bolt substituted for the expansion bolt. The point of attachment is close to where the brace is fastened to the arm. There is then but little bending moment on the arm, and the flat brace is in tension.

Double crossarms are used and there is a suspension insulator on each arm. On the upper side, a 2-wire, 2,300-volt circuit is carried on ordinary pin insulators and below, on pole brackets, is a telephone circuit. The line has been in use for several years and has survived heavy sleet storms.

Device Moves Chain Block With Ease and Safety

Often it is inconvenient and none too safe to move a loaded chain-block trolley by pulling or pushing directly on the load or its fastenings. This is especially true where the I-beam, supporting the trolley, is above a motor pit. An illustration of how easy it is to remedy such a condition can be seen in the machine shop and mo-

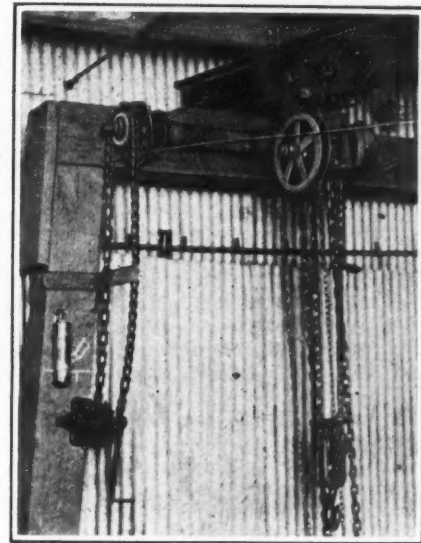


Protects Unwary Heads

It is hard for a heedless person to get into contact with the trolley wire running into the main slope of the Pennsylvania Coal & Coke Co.'s No. 18 mine at Barnesboro, Pa. The board guards are bolted to straps depending from the trolley bracket. This mine was recently reopened after having been down for more than two years.

tor barn of the Fordson Coal Co., at Nuttallburg, W. Va. The accompanying illustration shows the trolley-moving mechanism which was built from odds and ends picked up about the shop and from the scrap pile.

Mounted at one end of the I-beam



Windlass for Moving Trolley

The parts are odds and ends picked up on the job. With this device there is no struggle or danger in moving a heavy weight suspended by the chain block as the person doing the moving is at all times in the clear.

is a small drum or windlass. From one end of this drum a $\frac{1}{4}$ -in. wire rope goes directly to the trolley. From the other end a rope of the same size is carried over a sheave mounted at the other extremity of the I-beam, thence passing back to the trolley. In other words, the trolley is moved by means of a headrope and a tailrope, one unwinding from the drum as the other is wound onto it.

The trolley can thus be moved in either direction depending on which way the drum is rotated. The drum is turned by means of a crank which is mounted at a convenient height above the floor. An ordinary detachable-link chain connects this crank to the drum. With this windlass attached to the I-beam trolley, heavy or unsecurely attached loads can be moved with ease and safety.



News Of the Industry



Sentiment for Coal Legislation Has Cooled in Congress Since Settlement of Anthracite Strike

By Paul Wooton

Washington Correspondent of *Coal Age*

Interest in coal on Capitol Hill seems to be evaporating. Just after the settlement of the strike the authors of coal bills in each house professed relief on the ground that they at last could go ahead deliberately and carefully to work out legislation when the situation was not surcharged with emotion.

Despite these professions no progress has been made, at this writing, since the settlement. Chairman Parker of the House Committee on Interstate and Foreign Commerce has not made good his promise to conduct coal hearings, and as this is written the committee has heard of no plan or approximate date on which the coal bills are to be taken up.

The display of fireworks in the District of Columbia Committee of the Senate was interrupted by the dawn of plentiful supply. Even the sub-committee of the Senate Committee on Education and Labor—consisting of the redoubtable Borah, with Senators Copeland and Metcalf as fellow members—admittedly has done nothing. This sub-committee was charged specially with the duty of examining and passing upon the merit of all coal bills pending in the Senate. Senator Borah himself stated on the floor of the Senate that his own coal bill soon would be forthcoming, but his office says other matters have been claiming his attention.

Administration Still Lukewarm

Senator Oddie has found the administration's interest in coal legislation to be quite as lukewarm after the strike as was the case while it was pursuing its popular hands-off policy. To his request for a report on his coal bill Senator Oddie received this reply from Secretary Hoover:

"The President has recommended to Congress that action should be taken on the report of the U. S. Coal Commission. In order to work out the details of your draft it would seem to me desirable that the members of that Commission, the various representatives of employers and employees, and the experts in the different government bureaus be called before the committee to give information to the committee rather than to attempt to

anticipate in advance what the result of such an inquiry would be.

"I will be glad to appear before the committee if it is desired."

Since the Senate referred the Robinson bill to the Committee on Education and Labor, and since Senator Phipps, the chairman of that committee, has indicated that his committee will study the Robinson bill and all other coal bills now before the Senate, Senator Oddie will wait until that committee has concluded its work or has indicated that it will do nothing before he launches hearings. He sets forth his views in a letter to Secretary Hoover, which follows:

Oddie States Position

"I am in receipt of your letter of Feb. 13 in answer to mine of Dec. 10 last, in which I referred to you a copy of the bill S. 3 [for the creation of a Bureau of Coal Economics, and for other purposes] and asked that the Committee on Mines and Mining be furnished a report thereon.

"Your letter states it to be your judgment that, as the President has recommended to Congress that action should be taken on the report of the U. S. Coal Commission, it seems to you to be desirable, in order to work out the details of the above mentioned bill, that the members of that Commission, the various representatives of coal operators and employees, and the experts in the different government bureaus should be called before this committee to give it information, rather than to attempt to anticipate in advance what the result of such an inquiry would be.

"Inasmuch as the Senate, on the 6th instant, decided to refer to its Committee on Education and Labor a bill introduced by Senator Robinson of Arkansas, which undertakes to deal with the question of national emergencies arising in the production and distribution of coal, I am of the opinion that all interests would be best served if that committee should, in connection with its consideration of Senator Robinson's bill, hear yourself and those whom you have suggested with respect to Senate bill No. 3 and any other bills pending in the Senate relating to the general subject.

"The holding of hearings on this

subject by two committees of the Senate at the same time is unnecessarily expensive and time-consuming and would greatly tend to confuse the issue in the public mind. Any provisions of the bill S. 3 failing to receive adequate attention in hearings before the Committee on Education and Labor could be covered in supplemental hearings before the Committee on Mines and Mining. If, after completing hearings on S. 3, the Committee on Education and Labor shall have become convinced that the merits of that measure are such as to make action by the Committee on Mines and Mining desirable, a recommendation to the Senate to that effect could be made. I have every reason for believing that such a recommendation would be promptly acted upon by the committee of which I am chairman."

The most casual survey of the legislative situation shows that coal merely is a subject of speculation among political wiseacres and professional specialists.

Chief interest centers on details now leaking out concerning the alleged under-cover agreement between the anthracite operators and the miners. At its face value this agreement with its provision for a modified check-off, to be worked out by the Board of Conciliation, seems to be a substantial concession to the miners. The miners' leaders, at least, are busy assuring their followers that the operators have promised the check-off.

Study New Agreement

Most observers, however, are very skeptical on this point. They point out that since the plan depends on joint agreement by the two sides and the Board of Conciliation, it is no more certain to be acted on than the provision for arbitration. The arbitration machinery in the agreement will work only if the miners want it to work. Similarly the Board of Conciliation will act on the check-off only when the operators want it to act. In view of the oft-repeated refusal of the operators to consider the check-off, it seems unlikely that they will accept it now through the Board of Conciliation until they feel assured the arbitration feature of the agreement can be made to work.

In short, the producers seem to feel that the arbitration provision is worth as much to them as the check-off is worth to the miners. Any other supposition would admit the defeat of the operators and victory for the men.

All of this tends to strengthen a growing impression that the fight was close to a draw and to confirm the conclusion that the real victor was the anthracite-consuming public.

Fan and Foreman Not Needed in One-Man Mine, Colorado Judge Rules

District Judge Arthur Cornforth made permanent a temporary injunction in the case of Fred Sevcik, one-man mine operator of Colorado Springs, Colo., against State Coal Mine Inspector James Dalrymple, on Feb. 16. The court held that Dalrymple could not force Sevcik to install a fan in his property or to employ a foreman at the rate of about \$225 per month.

The effect of the decision is to

declare the state law requiring such things unconstitutional, and J. S. Breitenstein, of the Attorney General's office, representing Inspector Dalrymple in the case, said he would appeal to the Supreme Court.

The court holds that the law should not make the same provisions for a mine operated by but one man or employing only a few men as for a mine where a large number of miners are employed.

Favorable Report on Bill Expanding I. C. C. to 13 Appointed by Regions

Regional representation on the Interstate Commerce Commission is provided in a bill reported favorably by the Senate Committee on Interstate Commerce. The measure provides for increasing the membership from eleven to thirteen, eventually to be apportioned as follows:

New England Group—Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, one member.

Middle Atlantic States—New York, Pennsylvania, New Jersey, Delaware, Maryland, Ohio, District of Columbia, two members.

Lake Group—Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Kansas, Nebraska, three members.

South Atlantic Group—North Carolina, South Carolina, Georgia, Florida, Virginia, West Virginia, Kentucky, two members.

Gulf Group—Alabama, Mississippi, Louisiana, Arkansas, Oklahoma, Texas, Tennessee, New Mexico, two members.

Mountain Group—Montana, Wyoming, Colorado, Idaho, Nevada, Arizona, Utah, two members.

Pacific Group—Washington, Oregon, California, one member.

The committee's report has this to say by way of justifying regional representation:

"The object of this legislation is to bring together in the Commission as near as may be a personal knowledge of the transportation conditions and problems that exist in the different sections of the country. The combination of the local conditions produce the national conditions and proper administration of the national conditions must rest upon the intimate and accurate personal knowledge of the various local conditions.

"The very structure of our government is based upon local self-government and local representation in the general government.

"The several states are represented in Congress, bringing together the problems that arise in the several states that are to be solved under the federal Constitution.

"This vital principle is recognized and applied in the appointment of federal judges.

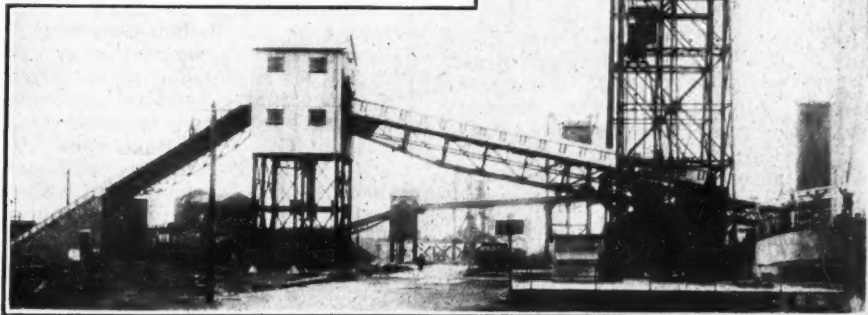
"It is applied in the appointment of the various boards and commissions created by Congress.

"The vastness of our territory and the varied forms and character of our articles of freight, the varied topography of the country, the differing degrees of development in the several parts of the country, the different degrees of possible development, the presence of actual and potential water competition in the form of river, lake and ocean transportation makes it the more imperative that there shall be represented in the semi-judicial body known as the Interstate Commerce Commission intimately and accurately these various factors. That these very vital differences exist is evidenced by the fact that the Interstate Commerce Commission has divided the country into what is called rate-making groups. This because it was imperative to treat each according to the condition therein existing."

Coal Stocks for 49 Days In Industrial Bins

Stocks of anthracite and bituminous coal in the hands of industrial consumers on Feb. 1, according to the National Association of Purchasing Agents, totaled 66,190,000 tons, or sufficient to last 49 days at the January rate of consumption. This compares with 68,399,000 tons on hand at the beginning of the preceding month and 50,028,000 tons on Feb. 1 a year ago.

During January, last, industries consumed approximately 41,892,000 tons of anthracite and bituminous coal, compared with 36,925,000 tons in December and 45,000,000 tons in January, 1925.



Loading Welsh Coal for Export to the United States

This belt conveyor system at the Port Talbot docks, Wales, transports coal from railroad yards at the left, across the street and down to a vessel's hold. The elevating structure at the right, with its counterweights, enables an operator to hoist or lower the end of the delivery conveyor to meet the height of the vessel.

British Empire Corporation Agrees to Check-Off

The British Empire Steel Corporation has agreed to restore the check-off at its coal mines in District 26, United Mine Workers (Nova Scotia), in a proposal submitted to the union executives late last week. Another proposal made by the miners' executives will be passed upon by the directors of the steel corporation this week, when an agreement is expected to be reached. The proposals were not made public.

Signing of a two-year contract under wage rates agreeable to both parties was prevented two weeks ago because the corporation insisted upon abolition of the check-off. The district union rejected the agreement by a majority of 3,735 votes. The contract was drawn up on the basis of the recent report of the Sir Andrew Rae Duncan Royal Commission.

Distribution Census Plan May Be Tried in 1928

Before any effort is made to induce Congress to authorize a census of distribution, which would require a large appropriation, it is proposed to select two or three important lines for the purpose of giving the plan a trial.

The first opportunity for the experiment will be when the manufacturers census is taken in 1928. If the trial demonstrates the value of this expansion of the census statistics, the appeal then can be made to Congress for the full census of distribution or the work can be undertaken gradually. This plan will require legislation, but no large amount of money.

Union Gives Up in Kanawha

The United Mine Workers ceased to pay relief to strikers on Big and Little Coal River, in the Kanawha (W. Va.) field on March 1. The order affects 2,500 miners and probably 4,500 dependents in the entire Kanawha field. At the present time there is no union mine south of the Kanawha River. Ten or eleven union mines continue to work in northern West Virginia, chiefly along Scotts Run, but otherwise the union ceases to be a factor.

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U. S. Steel Corporation Observes 25th Birthday; Has Remarkable Record

The United States Steel Corporation, the world's greatest industrial organization, was 25 years old on Feb. 25. Judge Elbert H. Gary, chairman of the board of directors of the corporation, has been its chief executive officer since its formation.

During its corporate existence the Corporation has done a gross business of approximately \$23,000,000,000, has disbursed to stockholders dividends aggregating \$1,279,253,784, and has paid out in wages something like \$6,496,268,920.

When the corporation began business in 1901 it had fifty subsidiary and sub-subsidiary organizations, fifteen of them main subsidiaries. Now there are 130 subsidiary and sub-subsidiary companies, twenty-seven of them main operating companies.

The Steel Corporation was the first billion-dollar corporation to be formed in the United States and it has consistently held its position as the premier industrial enterprise. The balance sheet shows that it has total assets of \$2,500,000,000. At the close of 1924 it had 246,753 employees, and the wages paid out in that year totaled \$442,458,577.

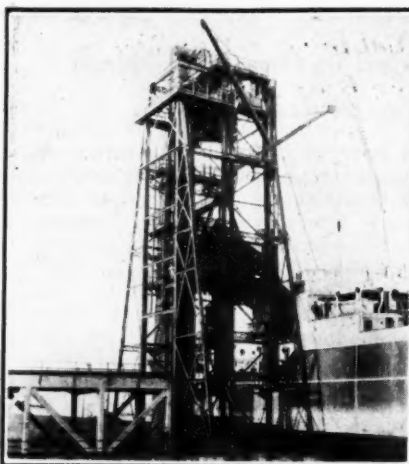
The net working capital at the end of 1924 was \$427,661,627. The capital surplus provided at the date of organization was \$25,000,000, and in the twenty-five years of the corporation's existence this has been increased to \$517,061,308.

Charles M. Schwab, now chairman of the Bethlehem Steel Corporation, was the first president of the Steel Corporation, having served from April 6, 1901, to Aug. 4, 1903. He was succeeded by W. E. Corey, who served from Aug. 4, 1903, to Jan. 31, 1911. James A. Farrell, the present incumbent, succeeded Mr. Corey.

The original executive committee comprised some of the most prominent men of the time, including Judge Gary, Daniel G. Reid, William Edenborn, Edmund C. Converse, James Gayley, Charles Steel, Charles M. Schwab and George W. Perkins, the last two being ex-officio members.

The most important of the ten companies originally merged into the giant Steel Corporation was the Carnegie Steel Co., dominated by Andrew Carnegie and producing practically one-fifth of all the steel made in the United States. This company itself had earned in 1899 a profit of nearly \$24,000,000, and in 1900 of approximately \$40,000,000. The Carnegie Steel Co. represented a consolidation of the Carnegie and Frick interests, and in absorbing this combination the new corporation acquired control of the most successful steel organization of the time.

The steel-producing equipment controlled by the new corporation consisted of 149 steel works with an annual capacity of 9,400,000 tons of crude and 7,700,000 tons of finished steel; 78 blast furnaces with a pig iron capacity of 7,400,000; more than 500,000 acres of coking coal lands, more than



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English Car Dumper in Action

This is a machine at the Alexander Docks, Newport, England. The hoist can lift railroad "wagons" up to 20 tons capacity, dumping them at any height up to 76 ft. into chutes delivering into ship's holds or bunkers.

1,000 miles of railroad, and a fleet of 112 vessels engaged in traffic on the Great Lakes, in addition to extensive holdings of undeveloped ore-yielding property, docks, natural gas, limestone properties and so forth.

Sayers to Succeed Read

Dr. R. R. Sayers, Chief Surgeon of the U. S. Bureau of Mines, will likely serve as Acting Safety Service Director for a month or so after the present Director, Dr. T. T. Read, leaves the service. Dr. Read takes up his new duties with the American Institute of Mining and Metallurgical Engineers in New York March 8.

Stover's Smokeless Coal Bureau is now located at 858 Earle Building, Washington, D.C., the transfer from the Chicago offices having been made March 1.

Foresees Coal Economies In Britain

George E. Learnard, of New York, a manufacturer of boiler room equipment who has been a close student of the British fuel situation, is quoted in an interview with *Electrical World* as saying:

"Legislation will shortly be passed by the British Government forcing the development of a national power supply from a series of large and economical stations. As large water supplies are infrequently found at the mines, I believe the government will co-operate in the development of a plan to distill coal at the shaft mouth. The motor spirits, tar and oils will be removed and used in industry and the residual fuel sent to power plants and coal users in pulverized form in which it can be stored and transported. England now imports motor spirits to the value of sixty million pounds sterling."

Plan New Union Drive in Northern West Virginia

One of the most intensive drives ever attempted will soon be launched in an effort to unionize northern West Virginia, according to a statement issued last week by Van A. Bittner, international representative of the United Mine Workers in that district. This follows closely a recent announcement by R. M. Williams, international representative in Monongalia County, that the union would issue another strike call to open-shop miners some time between April 1 and May 15. John L. Lewis, president of the miners' international union, declared a short time ago that Mr. Bittner had full authority to direct the union's efforts toward organizing the field.

Declaring that the recent anthracite settlement was "a great victory for the miners, their families and the United Mine Workers," Mr. Bittner added that "for the time being the entire efforts of the United Mine Workers will be centered on northern West Virginia, and, with our plans perfected, our policy will be to go onward and forward and not rest until every contract-abrogating coal operator reaffirms the union wage scale."

The proposed strike call will be the third issued in this region since the beginning of 1925. The first call was effective April 1 and the second on Sept. 26.

National Guard Keeps Peace In Southern Indiana

Peace reigned unbroken in the southern Indiana coal field last week following the dispatch of national guardsmen to Evansville as a result of a demonstration against non-union miners by unionists Feb. 16, in which one man was seriously injured and scores beaten and clubbed.

Detachments from four units of the Indiana National Guard are on duty in Evansville, where they are being held ready for emergency calls. Two aeroplanes, one mounting a machine gun and both equipped for bomb dropping, make daily reconnaissance flights over the field. The infantry units are completely equipped with chemical warfare appliances.

Non-union mines in the region have practically all resumed operations since the arrival of the troops. The only activity on the part of union workers reported was the holding of a mass meeting at Boonville on Sunday at which T. N. Taylor, Indianapolis, president of the state Federation of Labor, was the principal speaker.

Hudson Coal Co. to Erect \$2,000,000 Breaker

The Hudson Coal Co. has decided to erect a breaker costing \$2,000,000 at Olyphant, Pa., and in the near future the plans for the structure will be ready. The new breaker, it is said, will do the work that is now handled at three other breakers in the Olyphant field. The new plant will be even larger than the Hudson's Marvine operation in Scranton, one of the biggest in the anthracite field.

Did Electric Arc in Firedamp Cause Jamison Blast?

An arc from an undercutting machine, from a defective cable or from the breaking of the circuit between the cable and the power line flashing in an accumulation of gas, probably was the direct cause of the explosion that occurred on Jan. 14 at the No. 8 shaft mine of the Jamison Coal & Coke Co., Farmington, W. Va. The presence of the gas in turn was probably due to interrupted ventilation, an open door being a likely cause.

Whatever the initiating agents, the opinion is held that coal dust propagated the explosion, which finally was stopped by the water contained in the swags on the main headings. When the explosion occurred the company was engaged in a big program for reconditioning this mine to make it more safe and already had spent a large sum of money toward this end. These are deductions from the testimony of witnesses at the inquest of the disaster, which was held in Fairmont on Feb. 26. The verdict rendered was that the nineteen victims "came to their death by an explosion of gas ignited by causes unknown to the jury."

The explosion took place in the Seventh Right section, a new development which is turned off the main heading at a point about 3,000 ft. from the hoisting shaft. This section consists of a right and a left side, each of which was being ventilated by an individual split of air. At the time of the explosion two shortwall machines were at work in each of the two splits, or four in all in the section.

Prosecuting Attorney N. W. Ogden, counselled by R. M. Lambie, chief of the West Virginia Department of Mines, first of all tried to establish the fact that sufficient coal dust could not have been stirred up by the cutting machines to cause the initial ignition. This as an approach to the finding of the real medium, which was gas.

Deprecate Influence of Dust

Several other witnesses discounted any possibility of dust being the initiating cause, seeing that only two machines were on each of the splits and that these two were 500 to 1,000 ft. apart, intervals which would give ample opportunity for the dust caused by the first machine to settle in some degree before it could be carried by the air to the place where the second machine was at work.

William Leeper, fireboss, and Walter Brown, the mine foreman, remarked that under normal conditions the section would not have accumulated sufficient gas to cause the explosion, but the former declared that gas could have collected in sufficient volume had a door been left open, particularly in the No. 1 Right Butt entry of the section through which No. 4 machine had to pass. Assistant Mine Foreman William Beuglass visited the section on the day of the explosion. He found ventilation good and detected no gas.

One of the doors in the section was not destroyed by the force of the ex-

plosion, and an exploration crew found it standing open. This door might have been opened by the pioneer waves of the explosion, for which reason too much significance should not be attached to the position in which the door was found.

The fact that, as disclosed by Mine Foreman Brown, little gas was detected in the section after the explosion, with ventilation more or less impaired, led to the belief that an abnormal condition was set up prior to the explosion. State Mine Inspectors Kramer and Griffith were of the opinion that the piercing of a gas pocket by a cutting machine was the remote cause of the explosion. Many years ago the latter had served for eight years as foreman at this mine—in fact he held that office when the mine was first opened—and he recalled that the gas, emitted from pockets when punctured by drill holes, often made a loud whistle which at times frightened the men. This indicated gas under a high pressure. This gas would bleed off in two hours to three days.

A screw driver and hammer were found near No. 3 machine and the lid on the starting box was found lifted from its position. The body of an electrician was found in a chute of No. 1 butt heading, perhaps on his way to make repairs. However, there were no indications that this machine had anything to do with the explosion, which is believed to have started on the opposite side of the section.

Machines Ten Years Old

The four machines that were working in the section were installed about ten years ago. These were undercutters bearing approval plates of the West Virginia Department of Mines. (The department has long since ceased to issue such approvals.) The machines had no U. S. Bureau of Mines approval plates; in fact they were too old for that. All four machines were under coal in some stage of cutting, but all the controllers were in the off-position when found. However, one of the controllers might have been on at the time of the explosion. If the runner had his hand on the starter at the time, the force of the explosion would have caused him to pull the starter to the off-position as he was flung backward. The machines were not equipped with an automatic closing device on the starter.

Thomas Jarret, state mine inspector, said the force of the explosion was most markedly manifested in the Seventh Right section and thought that the most likely place for the starting of the explosion was the tight end of a crosscut which was being driven between Rooms 8 and 9 on the left side, from which point the force seemed to radiate. Machines Nos. 1 and 2 were at work on that side. A small piece of metal was broken out of the starting box casing on the first machine. The second machine was partially covered by a fall of slate. He testified that the rescuers encountered a number of

To Urge Higher Duty on Coal Imports to Canada

Two motions for increases in the duty on coal imports are to be made in the Dominion House of Commons. R. K. Smith (Conservative, Cumberland) intends to move for "an early enactment of a substantial increase in the customs tariff on the importation of coal and steel products of all grades and kinds into Canada from foreign countries." Mr. Smith takes the ground that such action "is essential to the well-being of the province of Nova Scotia and this Dominion."

T. L. Church (Conservative, Toronto Northwest) intends to move that the time has arrived for Canada to have a national policy in relation to its coal supply, and that no part of Canada should be left dependent on the United States for such supply. In his motion Mr. Church takes the ground that the government should immediately consider the initiation of an all-British and Canadian coal supply; that a duty should be placed on coal from the United States, to insure an all-British supply for Canada, and that coal should be carried on a preferential toll basis by the railways, on the same basis as grain and flour.

small fires which were quickly extinguished.

State Inspector W. B. Rigglesman, in whose district the mine is located, testified that quick liberation of gas from feeders is a comparatively common occurrence in this mine. He concurred with Mr. Jarret in the latter's belief as to the location of the seat of the explosion.

P. D. Costello, superintendent, on the stand outlined the measures his company had been putting into effect for greater safety. In the early part of 1925 the company decided to discontinue the use of electricity for cutting. Accordingly, prior to the explosion it had installed air compressors and air lines at a cost of approximately \$60,000. The compressor station had already been built in the Twentieth Right section (about 2 miles in by of Seventh Right section) and was supplying motive power to ten punchers in its section at the time of the explosion. Two electric machines were still in service in the section due to the difficulty of training men for the job of running the punchers. A similar compressor room in Seventh Right section was near completion. The additional cost of cutting by air punchers as against electric machines in this mine is 9c. per ton.

The mine was sprinkled every day. The use of water cars had been discontinued. Water lines were laid along entries at a cost of \$12,000. The intention was, and is, to extend sprinkling to the face of the rooms. No. 9 mine of the company in the same district was being rock-dusted and a rock-dusting machine was on order for this mine.

318 Killed in January Mine Accidents; High Rate Due to Explosions

Accidents at coal mines in the United States in January, 1926, caused the death of 318 men, according to information received from state mine inspectors by the U. S. Bureau of Mines. All but three of the fatalities occurred at bituminous coal mines. The unusually large total for the month was due to four major explosions that caused the death of 142 men. In January a year ago only one major explosion occurred, with a loss of 6 lives. Because of the four disasters, the death rate for bituminous mines was 5.87 per million tons, based on a production of 53,662,000 tons, as compared with 3.47 for January last year based on an output of 51,930,000 tons. The non-disaster rate for January, 1926, for bituminous mines was 3.22 and that for January last year was 3.35.

The most disastrous explosion during the month was that which occurred at Wilburton, Okla., on Jan. 13, which resulted in the death of 91 men. On Jan. 14 an explosion in a mine at Farmington, W. Va., killed 19 men. Five lives were lost in a mine explosion at West Frankfort, Ill., on Jan. 29. The death of only 5 men out of more than one thousand men in the mine at West Frankfort at the time of the explosion is attributed to the use of rock dust, which localized the effects of the blast. The fourth explosion was at Helena,

Urges Body to Maintain Industrial Peace

Creation of an industrial Relations Commission of nine members "to discover the laws of industrial peace and effect a uniform compliance with them by capital and labor in all industries engaged in interstate commerce" was proposed in a resolution introduced in Congress, at Washington, Feb. 20 by Representative Browning, Democrat, of Tennessee.

Ala., on Jan. 29, and resulted in the death of 27 men.

The figures for all mines for January, 1926, when compared with those for the same month last year, indicated reductions in the per-million-ton death rates from falls of roof, haulage, explosives and electricity. Only explosions showed an increased death rate, and this rate was more than ten times the rate for January, 1925, and nearly five times the average rate for the year 1925. The following figures show the death rates per million tons for the principal causes of coal-mine fatalities:

	Year 1925	Jan., 1925	Jan., 1926
All causes	3.811	3.959	5.906
Falls of roof or coal	1.842	1.971	1.876
Haulage .....	.615	.859	.724
Gas or dust explosions .....	.590	.270	2.823
Explosives .....	.174	.337	.074
Electricity .....	.144	.152	.130

Note Issue to Finance New Hazle Brook Breaker

An issue of \$2,000,000 6 per cent gold notes of the Hazle Brook Coal Co., dated March 1, 1926, and maturing serially from March 1, 1927, until March 1, 1936, is announced by Brown Brothers & Co. and Edward B. Smith & Co. The Hazle Brook company operates seven anthracite collieries under leases covering about 8,913 acres of coal lands in Schuylkill County near Pottsville, Luzerne County near Hazleton, and in Columbia and Northumberland counties, Pennsylvania. Over one-third of its coal is produced by modern stripping methods. The company also owns five breakers of modern design with all necessary equipment and has begun the erection of a new breaker which will increase its productive capacity to 1,525,000 tons per year. The proceeds from the sale of these notes will be used for the erection of the new breaker with improvements, for the retirement of all mortgage indebtedness and for other corporate purposes.

State Mine Chiefs to Confer

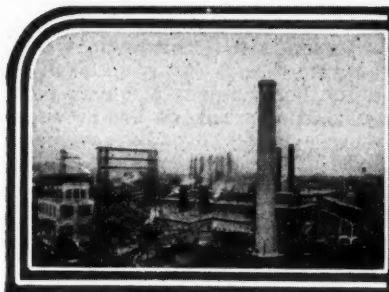
The semi-annual conference of the heads of the state mining departments of Pennsylvania, Maryland and West Virginia will be held in Pittsburgh on March 5. J. J. Walsh, secretary of the State Department of Pennsylvania; Dr. J. J. Rutledge, chief engineer of the Maryland Bureau of Mines, and Robert M. Lambie, chief of the state Department of Mines of West Virginia, will attend.

Coal-Mine Fatalities During January, 1926, by Causes and States

(Compiled by Bureau of Mines and Published by Coal Age)

State	Underground											Shaft				Surface						Total by States				
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Explosions of gas or coal dust.	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total.	1926	1925
Alabama.....	3		6	28								37													37	8
Alaska.....																									0	0
Arkansas.....																									0	3
Colorado.....	2	1										10													10	6
Illinois.....	6		3	7			2					18	1												19	18
Indiana.....			2									2													2	8
Iowa.....																									0	3
Kansas.....	2											2													2	1
Kentucky.....	11		2				1				1	15													15	21
Maryland.....	1											1													1	2
Michigan.....																									0	0
Missouri.....																									2	0
Montana.....	1											2													1	0
New Mexico.....	2											2													2	0
North Dakota.....																									0	0
Ohio.....	3											3													4	12
Oklahoma.....	1		2	91			1					95													95	0
Pennsylvania (bituminous).....	22	2	5		1						1	31										1	1		32	34
South Dakota.....																									0	0
Tennessee.....	3											3													3	2
Texas.....																									0	0
Utah.....																									0	4
Virginia.....	3						1					4													4	6
Washington.....		1										1													1	3
West Virginia.....	35		17	19	2	1	2	1	1			78										1	1	4	82	47
Wyoming.....	1		2									3													3	1
Total (bituminous).....	96	4	39	152	4	1	7	1	1		3	308	1					1	3			2	1		315	180
Pennsylvania (anthracite).....	1											1													3	55
Total, January, 1926.....	97	4	39	152	4	1	7	1	1		3	309	1					1	4			3	1		318	
Total, January, 1925.....	109	8	51	16	20		9	1	2		3	219	2	1	1			4	5			6	8			235

¹Only one fatality owing to strike in anthracite mines.



News Items From Field and Trade



COLORADO

The State Coal Mine Inspector's report for January, just released, shows a decrease of 245,000 tons in Colorado's coal output compared with the same month a year ago.

ILLINOIS

The Knox Consolidated Coal Co., of Indianapolis, Ind., operating mines in the Indiana Fourth and Fifth Vein fields, has taken over the business and personnel of the Great-West Coal & Lumber Co., Fisher Building, Chicago. R. E. Barr, formerly president of the Great-West company, has been appointed Northwestern manager, and with him will be associated practically the entire force of the old Great-West company.

The Majestic mine of the Crerar-Clinch Coal Co. broke its output record in the month of January, 1926, with 83,500 tons of coal. The mine has worked full time every day since Oct. 1, 1925. It has been in operation for twenty years.

INDIANA

The Fort Branch mine, Fort Branch, is cleaning up its property preparatory to closing down indefinitely. About 160 men are employed when the mine is operating at capacity.

Agents representing C. W. Willis, of Sullivan, Ind., are obtaining options and leasing 2,000 acres of stripping coal lands east of Hartwell, near Petersburg, with the intention of opening another big stripping mine in southern Pike County. The tract under option is connected with the Southern Ry. by a switch.

The machine shops and supply rooms of mine No. 28 of the Vigo Mining Co., at Sullivan were burned Feb. 13, causing an estimated loss of more than \$50,000. The flames were discovered late at night and had gained such headway that they could not be controlled. The storerooms contained much valuable mine machinery and equipment. The origin is not known.

KANSAS

Work was resumed Feb. 23 in the Newlands-Haynie mine, in the southeastern Kansas field, where a strike was called Feb. 2 in protest against penalties imposed by the company on three miners for dirty coal. Officials of district 14, United Mine Workers, insisted responsibility for dirt in the

three protested cars could not be determined, as others than those whose names appeared on the cars assisted in loading them. The penalties were set aside in the agreement reached.

The district board of District 14, United Mine Workers, called a strike, effective Feb. 19, at Katy mine, No. 2, southeastern Kansas field, operated by Jim Price, Joe Lafayette and George Mercz. The union officials said the operators refused to recognize a committee appointed by the miners. Twenty-seven men walked out.

KENTUCKY

Green River mine, located between Hebbardsville and Curdsville, will open soon, according to Ollie Keach, of Evansville, Ind., president of the Green River Kentucky Coal Mining Co. The mine recently was auctioned at a commissioner's sale, the owners buying in the stock and Keach succeeding himself as president.

The H. T. W. Coal Co., organized a short time ago to take over the mines of the Alma-Thacker Coal Co., which was forced into the hands of receivers in 1925, is operating the mines with a daily output of about 600 to 800 tons. The product is being sold through the Central West Coal & Lumber Co., of Columbus, Ohio. J. W. St. Clair is at the head of the company.

The West Kentucky Coal Co. and St. Bernard Coal Co. for the year ended Dec. 31, 1925, shows surplus of \$372,378 after taxes and charges, but before depreciation, against \$676,028 in 1924.

Coal men and other business interests of the Whitesburg section are endeavoring to bring pressure to bear on the Louisville & Nashville R.R. to force the road to carry out an alleged promise to build a connecting link from Whitesburg to Elkhorn City, there connecting with the Carolina, Clinchfield & Ohio Ry. It became known recently that, because of the heavy cost of construction in rough country, the road had decided not to build a connection through from its eastern Kentucky division, and would merely connect up from the Cumberland Valley division, in the Harlan section.

MISSOURI

Joseph Landreth, 57, proprietor of the Landreth coal mine, at Marceline, was instantly killed by a fall of rock in his mine, Feb. 12. Frank Ellis, a miner, was dangerously hurt and is in a hospital.

The Central Coal & Coke Co. and

subsidiaries for the year ended Dec. 31, 1925, show net profit of \$74,144, equivalent to \$3.95 a share. This compares with \$364,035, or \$5.27 a share, in 1924.

OHIO

Preliminary figures given out by various railroads in Ohio covering coal production during 1925 show that a total of 479,553 cars, or about 23,977,000 tons, of coal was mined as compared with 581,300 cars, or about 29,000,000 tons, in the preceding year. It is estimated that only about one-fifth of the tonnage used in Ohio is produced in the Buckeye State, the remainder coming from West Virginia and Kentucky to a large extent. Of the total output in the state in 1925 the southern Ohio field produced 115,289 cars, or about 5,764,000 tons. Of that production 57,023 cars, or about 2,851,000 tons, was commercial coal; 53,907 cars was railroad fuel, and 4,359 cars, or 217,000 tons, shipped to the lakes.

Owing to the depression in the coal industry, with less than one-half of the 17,000 miners in the eastern Ohio field at work, members of the Fifth sub-district of the United Mine Workers have voted to postpone the twenty-eighth annual convention until March, 1927.

Advanced training in mine rescue work was given at Nelsonville last week by the U. S. Bureau of Mines and half of the force of inspectors of the Ohio Department of Mining were in attendance. The other half will receive the training next week.

M. A. Hanna Co. reports for the year ended Dec. 31, 1925, net income of \$123,294 after interest, depreciation, depletion and federal taxes, equivalent to \$1.10 a share, on the first preferred stock. This compares with net loss of \$1,651,572 in 1924.

The New Pittsburgh Coal Co., of Columbus, a subsidiary of the Pittsburgh Coal Co., has purchased a large tract of coal land in the Pomeroy Bend district. The acreage had been under lease by the company for some time. The purchase price was in the neighborhood of \$100,000.

PENNSYLVANIA

The increased value of coal-mine dumps in the anthracite field was brought out recently when the ownership of a bank at New Philadelphia was disputed before an alderman in Schuylkill County. The plaintiff in the case was H. R. Seligman, president of a coal mining concern in Lackawanna County, who charged J. O. Ulrich and

J. E. Kirby with taking a bank worth \$100,000. Seligman also charged that Ulrich had made threats against him unless he kept away from the coal dump. In their reply Ulrich and Kirby contended they had been worked out of the lease on the mine dump through improper methods, but a counter suit brought against the Lackawanna man was dismissed. The alderman held Kirby and Ulrich for trial on Seligman's allegations. The bank in question is said to contain thousands of tons of burnable culm, yet ten years ago it was deemed of no great value.

Court in Schuylkill County has been asked by trustees of the Stephen Girard estate to put a stop to juicy fees being collected by the treasurer of the school district in West Mahanoy Township, in which nearly all of the assessable property is owned by the Girard estate. Court is asked to limit the treasurer's fees to \$500 a year. It is alleged that if the tax collector in the township is allowed to collect the usual commissions he will receive \$7,000 a year for little or no work and that such a procedure would mean a waste of the taxpayers' money. Much interest is being manifested in the case due to the fact that in many other districts coal companies pay from 70 to 90 per cent of the taxes.

The preliminary report of the Pennsylvania Coal & Coke Corp. for the year ended December 31, 1925, shows a deficit of \$461,294 after depreciation, depletion, etc., as compared with a deficit of \$428,376 in 1924. Deficit for the fourth quarter last year was \$3,760, against \$129,720 in the fourth quarter of 1924. December net income was \$320 before federal taxes, against a deficit of \$42,770 in December, 1924.

Operations will be resumed soon at the Buck Ridge mine, at Johnson City, according to an announcement last week. This mine formerly was owned by the Puritan Coal Co. This concern went into the hands of a receiver and it is now understood that the Buck Ridge operation is to be taken over by one of the largest independent producers in the Pottsville area. Former Governor Sproul of Pennsylvania is mentioned as being interested in the deal. Mr. Sproul is heavily interested in the South Penn Collieries Co., which has several operations in the Scranton field.

A commission composed of Dr. J. J. Rutledge, of Baltimore, chief engineer of the Maryland Bureau of Mines; S. A. Taylor, of Pittsburgh, president of the American Institute of Mining and Metallurgical Engineers, and Robert M. Lambie, chief of the West Virginia Department of Mines, will investigate the cause of the mine blast at Horning mine of the Pittsburgh Terminal Coal Co., in the Pittsburgh district, beginning March 4.

No giant power legislation will be enacted by the special session of the Legislature at Harrisburg, the Senate corporations committee last week having reported out with a negative recommendation all the Pinchot giant power bills. These eight measures took the place of twenty-two that met

a similar fate during the regular legislative session last year.

From proceedings originating in Allegheny County, the Fayette courts on Feb. 25 ordered the sale of the Albany and Ferry mines by the receivers of the Forsythe Coal & Coke Co. to the Albany Coal Co., both Pittsburgh corporations. The Albany mine is located near Brownsville, and the Ferry plant, near East Millsboro. The consideration was withheld. The receivers of the Forsythe company are Connie C. McGregor and R. L. James.

A new seam of anthracite 16 ft. thick was discovered recently by diamond drill men of the Dodson Coal Co. near Hazleton. Development will begin at once, the coal being prepared at the Beaver Brook mines. The seam is thought to be a merger of the thick mountain strata which "pinch out" in other properties of the company.

TENNESSEE

J. H. Mitchell, H. C. Kivett and the Frost interests, of Corbin, Ky., recently purchased the Queen & Crescent coal properties at Moreley, at a price of \$27,000. Mr. Mitchell has been named president of the company; Mr. Kivett, vice-president; Charles Frost, Sr., general manager and Charles Frost, Jr., secretary-treasurer.

UTAH

The Standard Coal Co. has laid off 105 men at its mine, one-third of the entire force.

Application for the appointment of a receiver for the Great Western Coal Mines Co., of Salt Lake City, has been made. The application is made by a Mr. A. Strebel, who claims to have a secured judgment against the company for \$6,487.36, and it is stated that so far but \$100 has been paid. It also is alleged that the company has certain assets which it could dispose of or utilize for the benefit of its creditors, but refuses to take any steps in this direction.

The Denver & Rio Grande Western R.R. has applied to the Utah Public

Utilities Commission for permission to construct a railway from Spring Canyon Junction to Kenilworth, which would reduce the grade from 6.10 to 3 per cent. The company also asks permission to abandon the old line between the same points. The improvement would cost, it is estimated, \$500,000.

The Utah Public Utilities Commission has dismissed the application to build a branch line up the Huntington Canyon for coal purposes. The application had been pending since 1922 when it was originally filed by Arthur and James H. Mays under the name of the Central Railway Co.

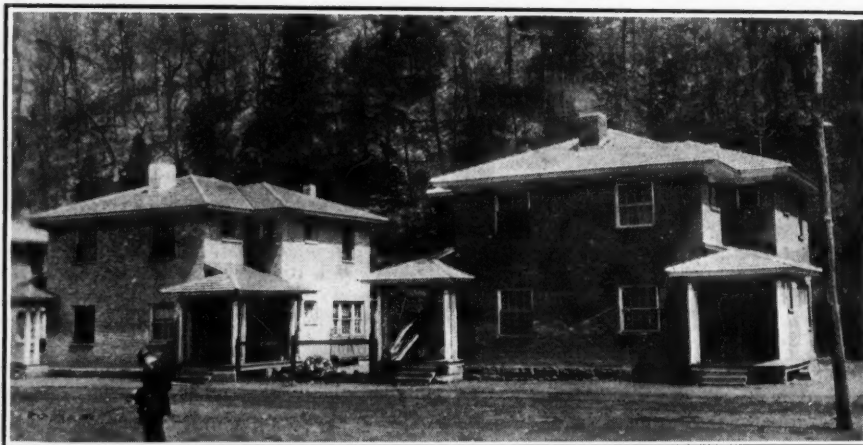
It is announced that plans will be made to rush development work on its properties in Salina Canyon by the Sevier Valley Coal Co., of Richfield. The shaft is now being sunk through solid rock, it is stated. It is expected that the branch line to the mines will be completed by the coming summer.

Register Eli F. Taylor of the federal land office will offer 40 acres of coal land for lease on March 31. It is located near Emery, in Emery County. The property was operated once by the Black Diamond Coal Co., but was taken back by the federal government on the ground that the terms of the lease were not fulfilled.

VIRGINIA

Chesapeake & Ohio Ry. suits aggregating \$400,000 are affected by a recent decision of the Virginia State Supreme Court of Appeals granting a writ of error to the Smokeless Fuel Co. in an appeal from the Circuit Court of Newport News, involving a suit for \$7,093.56. The suit was one of a number of cases in which the railroad is seeking to recover alleged demurrage due on shipments of coal. Request for a writ was presented Feb. 9.

Increasing its total output of soft coal by nearly 2,000,000 tons over the preceding year, the state of Virginia easily maintained its position last year as eighth among all of the coal-producing states of the country. Virginia's total production for 1925 was 12,455,000 tons, as compared with 10,693,000 tons in 1924.



Substantial Dwellings Erected by the Kingston Pocahontas Coal Co.

These dwellings are of modern brick construction and each building houses two families. Large windows and sufficient space between each dwelling provide plenty of light and fresh air for the occupants.

WEST VIRGINIA

Ignition of a small pocket of gas in the Arnettville mine of the Fort Grand Coal Co. recently caused a fire which caused minor damage, as the blaze was quickly extinguished by W. B. Riggleman, and other safety experts. Six miners, in the mine at the time of the explosion, were unharmed.

Miners in three Elm Grove mines, near Wheeling, have been provided with safety lamps to replace the open carbide lights formerly used. The new electric safety lamps were recommended by Robert M. Lambie, chief of the State Department of Mines.

The Crozer Coal & Coke Co. of Crozer, near Elkhorn, McDowell County, recently installed a 3,000-ton screening and coal preparation plant.

The Davis Colliery Co., at Jontee, Gilmer County, recently installed a \$60,000 tippie.

The Davis Creek Land & Coal Co., Charleston, has installed screens to prepare nut sized bituminous coal.

The C. H. Mead Coal Co. has awarded a contract for the erection of a new tippie at its No. 2 operation. The structure will have four tracks and be equipped with the latest screening machinery for the preparation of coal. The Mead company has started putting in a slope to the No. 3 Pocahontas seam and the coal from the new mine will be run over the new tippie in addition to that from the No. 2 mine operating in the Beckley seam. The tippie will handle 2,500 tons in eight hours and will be one of the best equipped in the Winding Gulf field.

Robert M. Lambie, chief of the state department of mines, presented each of the 20 survivors of the explosion at mine No. 8 of the Jamison Coal & Coke Co. with "self rescuer" chemical masks, which is a protection against the fumes of carbon monoxide.

Gordon B. Late, Clarksburg coal operator, recently acquired a lease on the Austin Coal Co.'s coke ovens in Preston County and has put the plant in condition for immediate operation. This is one of the oldest plants in the state, but it has been idle for several years.

More rigid enforcement of the state mining laws is being sought by Robert M. Lambie, of Charleston, chief of the Department of Mines, who declares that too many accidents have been occurring in the mining fields. As a means of reducing the number of accidents, the head of the department has directed all state mining inspectors to prosecute all offenders who do not comply with the law. In line with this order, three prosecutions recently were instituted in the Panhandle section by A. E. Lafferty, of Moundsville, the penalties varying from \$50 to \$150 and costs.

Reconstruction of the Baltimore & Ohio R.R. bridge across the Guyan River at Huntington, is contemplated, the company having made a request of the War Department to approve the plans, according to Major H. M. Trippe, U. S. District Engineer at Huntington.

Plans are being made by the Superior-Pocahontas Coal Co. to open a new mine at Davy, along the Norfolk & Western Ry. The company will develop a tract of 2,300 acres of virgin smokeless coal land, and it is planned to expend \$65,000 in making improvements as soon as the weather conditions are auspicious.

The Portsmouth By-Products Co. has awarded a contract for the erection of a \$250,000 tippie at its Freeburn mine, near Williamson, to cost approximately \$250,000. When completed, the loading capacity of the mine will be increased to 4,000 tons of coal every eight hours. At present the loading capacity is 2,500 in 12 to 13 hours. It is expected that construction work will begin within 30 days and will be completed in September.

The Winding Gulf Colliery Co., at Winding Gulf, is preparing to spend \$50,000 for a new tippie and screening outfit. Work will be started as soon as the weather permits.

The Scotts Run operations of the Connellsville By-Product Coal Co., of the J. A. Paisley interests, of Cleveland, will be rock-dusted soon. According to reports the machinery has arrived.

WYOMING

P. J. Quealy, president of the Kemmerer Coal Co., has just announced that work will be started immediately on the opening of a new mine by that company on the Sublet No. 5 vein, four miles northeast of Kemmerer. The program calls for an expenditure of \$400,000. The first work will be the construction of a 1,500-ft. slope to the coal seam, practically all of which will be rock work. A 660-ft. ventilating shaft is to be sunk to this slope. It is expected that actual production will be possible within another year. The mouth of the slope will be near the old Susie, or No. 4, mine of this company.

CANADA

Canada's production of coke in 1925 totaled 1,471,116 net tons, an increase of slightly more than 100,000 tons over the year preceding. Trade Commissioner Lynn W. Meekins, Ottawa, reports to the Department of Commerce. In addition to the amount produced locally, 852,427 tons was imported. In the production of the domestic product 660,760 tons of Canadian and 1,581,466 tons of imported coal was used.

Imports of coal into Canada from the United States during 1925 were as follows: Anthracite, 3,225,398 tons valued at \$26,996,042; bituminous, 12,501,096 tons, valued at \$26,758,170, as compared with imports of anthracite 3,878,721 tons, valued at \$34,804,748, and bituminous 12,500,616 tons of the value of \$29,431,661 during 1924. Imports of coal from Great Britain during 1925 consisted of 558,259 tons of anthracite of the value of \$5,100,467 and 46,858 tons of bituminous valued at \$213,722 as compared with 273,277 tons of anthracite valued at \$2,472,737 and 43,835 tons of bituminous of the value of \$188,483 during 1924.

Traffic

Ask Extension of Emergency High-Volatile Rates

Operators of the Williamson field and other southern West Virginia high-volatile regions have filed a plea with the Interstate Commerce Commission asking continuance of the emergency rate granted by the Commission on prepared coal to New England and the Atlantic Coast states. Shippers believe that it will be possible to retain the Eastern market if rates are reasonable. When the present through rate was granted as an emergency measure during the anthracite strike, April 30 was set as the date for restoring the former rates.

N. & O. to Penalize Shipment On Consignment

Information has been received by coal operators along the Norfolk & Western Ry. that beginning March 15 this road will penalize operators shipping unconsigned coal loads to either the Bluefield or Portsmouth scales. A penalty of \$2 a car will be imposed on the shipper, which will carry for a 48-hour period, after which the regular daily demurrage rates will apply. The order is similar to the one issued by the Chesapeake & Ohio Ry., according to coal operators.

C. & O. Adjusts All-Rail Rates To Northwest

The Chesapeake & Ohio Ry. has issued freight tariff No. 1160-C, I.C.C. No. 10,218, reducing rates on coal to northern Illinois to the extent of 15c. per ton and establishing joint through rates to southern Wisconsin on an adjustment similar to the one made to trans-Mississippi River territory. This final adjustment in "Northwestern All-rail Rates" establishes the same rates from northeastern Kentucky mines to destination territory as those in effect from mines on the Louisville & Nashville R.R., which are substantial reductions from the combination of local rates, which were the only rates the northeastern Kentucky or Big Sandy district had in effect. The new rates become effective as of March 15, 1926.

Association Activities

At the annual meeting of the Pittsburgh Vein Operators' Association, held Feb. 24, at the Hotel Cleveland, Cleveland, Ohio, the name of the organization was changed to the Eastern Ohio Coal Operators' Association. This change was made in order to promptly describe the mining location of its membership and more clearly indicate that the mine properties were located in the State of Ohio. The following officers were elected: President, Ezra Van Horn, general manager, Clarkson Coal Mining Co.; Vice-President, W. L. Robinson, vice-president, Youghiogheny & Ohio Coal Co.; Treasurer, H. R. Sullivan, treasurer, Central Coal Mining Co.; Secretary, D. F. Hurd.

Personal

There is an opening on the editorial staff of *Coal Age*. Please address J. E. Spurr, *Coal Age*, 10th Ave. and 36th St., New York, giving such information as would be of interest.

J. C. Myers has resigned as superintendent of the Wisconsin Coal Co., at Anco, Ky., effective in a few weeks. He has not announced his plans for the future.

Simon Levy, president of the Boylston Coal Co., Chicago mail order coal house, was held on a \$10,000 bond recently, charged with using the mails to defraud.

J. P. Routh, president of J. P. Routh & Co. and the Riberena Fuel & Chartering Co., announces the opening of offices in the Bankers Trust Building, Norfolk, Va., with J. H. Tonkin in charge.

G. R. Krebs, of Charleston, W. Va., is among those interested in the Camp Fork Coal Co., a recently organized corporation with headquarters at Greendale, Nicholas County, W. Va.

George Wolfe, formerly secretary of the New River Coal Operators' Association, with headquarters at Beckley, W. Va., has moved to Norfolk, Va., and is engaged in the general investment business.

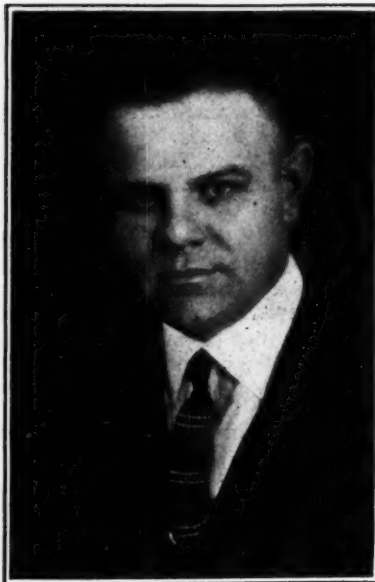
Harry A. White has been appointed district manager at Norfolk for the Pocahontas Fuel Co., Inc., succeeding Edwin O. Parkinson, who died several weeks ago. Mr. White formerly was assistant manager of the Norfolk office of the company.

Daniel F. Gallagher, who for several years was New York manager for Campbell, Peacock & Kinzer, is now connected with the Shanferoke Coal & Supply Corp., 120 Broadway, New York City. The Shanferoke corporation recently became representative for Campbell, Peacock & Kinzer in New York State and northern New Jersey.

E. C. Pratt, president of the Republic Coal Co., of Minneapolis, Minn., recently started on a three weeks' trip which is to include a stop at Herrin, Ill., where the Pratt Brothers Co., of which he is the head, has a mine.

John A. Howe, of Minneapolis, Minn., vice-president and general manager of the Carnegie Dock & Fuel Co., says that indications point to 1926 being a good year in the coal trade in the Northwest. Consumers would do well, he said, to contract for coal in sufficient quantities this season to provide against a possible suspension of mining in union bituminous fields when the Jacksonville agreement expires, April 1, 1927.

William Bartrim, combustion expert for the Midland Coal Co., Kansas City, Mo., recently received a letter from H. E. Shrack, Topeka, assistant manager of the Board of Administration of Education, Charitable and Correctional Institutions of Kansas, announcing that the state will save about \$60,000 this year through improvements and alterations in heating equipment.



E. W. Davidson

E. W. Davidson has resigned as managing editor of *Coal Age*, effective March 1, to take charge of publicity for the Society for Electrical Development, 522 Fifth Ave., New York City. Mr. Davidson had been on the editorial staff of *Coal Age* for five years, four years as Western editor, stationed at Chicago, and one year as managing editor. The good wishes of the editorial staff and doubtless of the readers of *Coal Age* accompany him.

Obituary

John Finger, 93 years of age, founder of the Finger Brothers Pittsburgh & Kanawha Coal & Coke Co., at New Albany, Ind., large handlers of river and rail coal, died at his home in New Albany, on Feb. 23, following a short illness. A native of Germany, he came to America as a boy, and founded the coal company about thirty-five years ago. He is survived by three sons, four daughters and his widow.

Frank A. Schneider, for many years in the coal trade of St. Paul, Minn., died last week, after an illness of a few weeks. He was 48 years of age and left a widow, a son and a daughter. When but 15 years old he started with the North Western Fuel Co., of St. Paul, and continued in various positions until about 1912, when he went with the C. Reiss Coal Co. with which he remained until his death. Funeral services were conducted under Masonic auspices.

Trade Literature

Blasters' Handbook. E. I. duPont de Nemours & Co., Wilmington, Del. Pp. 198; 4x7 in.; illustrated. Describes practical methods of using explosives for various purposes.

Jeffrey Coal Cutters, Loaders and Mine Conveyors. The Jeffrey Mfg. Co., Columbus, Ohio. Catalog No. 425. Pp. 34; 7½x10½ in.; illustrated. Illustrates and describes features of construction, methods of application, etc., of Jeffrey machinery; data on performance records are included.

C-E Flin Furnace. Combustion Engineering Corp., New York City. Catalog FF-1. Pp. 20; 8½x11 in.; illustrated. Describes the advantages of this water-cooled type of furnace wall. The book should prove of

interest to those connected with power generation.

The following bulletins were recently issued by the Sullivan Machinery Co., Chicago, Ill.: **Plug Drills**, Class DH-3; Bulletin No. 81-K. **Clay Spader**, Class DE-361; Bulletin No. 81-J. **All-Hammer, Light Drill Steel Sharpener**, Bulletin No. 72-L. **Drill Steel Furnace for Oil or Gas Fuel**, Bulletin No. 74-B. **Belt-driven Air Compressors**, WG-6; single-stage and WH-6 two-stage; Bulletin No. 83-E. **Buster for Breaking Concrete**; DW-221, heavy duty, and DP-221, light duty; Bulletin No. 81-I. **Automatic Line Oilier for Rock and Hammer Drills**; Bulletin No. 81-H. These are 6x9 in., illustrated.

Combustion Steam Generator. Combustion Engineering Corp., New York City. Pp. 6; 8½x11 in.; illustrated. The advantages and construction of this generator are described.

Common Sense in Steel Dollars. Heintz Mfg. Co., Philadelphia, Pa. Pp. 16; 6x9 in.; illustrated. Describes the steel welding operations of this company.

Crowding the Blasting Crew is the title of Bulletin 317, issued by the Marion Steam Shovel Co., Marion, Ohio, describing its shovel operations. The book has 16 pp., is 8½x11 in., illustrated.

The United States Distributing Corporation, New York City, has issued a 39-pp., 8x10½ in. book illustrating and describing the activities of its subsidiaries.

Industrial Notes

George E. Cullinan has been elected vice-president in charge of sales and a director of the Graybar Electric Co., which has just been organized to succeed the supply department of the Western Electric Co. Leo M. Dunn has been appointed vice-president in charge of merchandising and accounting.

Allis-Chalmers business in Continental Europe will be handled through an organization recently incorporated as Allis-Chalmers (France), with headquarters at 3 rue Taitbout, Paris. H. I. Keen, who has been manager of European sales through the company's district office in Paris, will be the managing director of the new organization. The company has maintained for many years an office in London at 728 Salisbury House, London Wall, E. C. 2.

W. C. Adams, member of the firm of Allen & Garella Co., Chicago, will hereafter be located at Birmingham, Ala., in the Birmingham Age-Herald Building, as resident engineer of the company.

The Cutler-Hammer Mfg. Co., of Milwaukee, Wis., has opened a new sales office in the Healey Building, Atlanta, Ga., to take care of the trade in the states of North Carolina, South Carolina, the eastern section of Tennessee, Georgia, Florida, southern Alabama and Mississippi. A. C. Gibson, formerly of the Philadelphia office, is in charge. The General Machinery Co. of Birmingham, Ala., will continue to serve the northern half of Alabama.

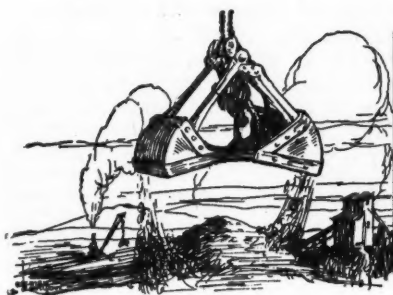
The Superheater Co., of New York and Chicago, recently elected M. Schiller vice-president in charge of accounts and purchases, and W. F. Jetter, treasurer and assistant secretary. Bard Browne was appointed assistant to the vice-president in charge of sales and service, and T. F. Morris, assistant secretary and assistant treasurer.

S. C. Ebbert, who was connected with the Birmingham offices of the General Electric Co. for a number of years, has formed a connection with S. L. Morrow, 720 Brown-Marx Building, Birmingham, Ala., sales representative of Link-Belt Co. and H. W. Caldwell & Sons Co. Mr. Ebbert is a mechanical and electrical engineer of recognized ability and is thoroughly acquainted with the industrial needs of the district.

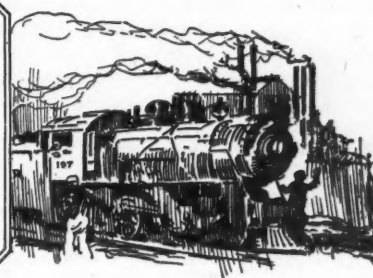
Publications Received

A Century of Progress. A history of The Delaware and Hudson Co., 1823-1923. Pp. 755; 5 x 8 in.; illustrated.

The Bureau of Mines Orsat Apparatus for Gas Analysis, by A. C. Fieldner, G. W. Jones and W. F. Holbrook. Bureau of Mines, Washington, D. C. Price, 5c. Technical Paper 320. Pp. 18; 6 x 9 in.; illustrated. Describes the apparatus used in the gas laboratory of the Bureau of Mines at Pittsburgh, Pa., for the complete and partial analysis of gases.



Production And the Market



Liquidation Process Rules Soft-Coal Market; Anthracite Situation Paradoxical

The process of liquidation in the bituminous coal markets of the country still continues. The process is marked more by sharp recession in demand than by sharp breaks in spot prices. The latter are still working to lower levels, but the descent is not abrupt. The decline is moderate because prices as a whole have been so low that pronounced declines would throw more companies into operations at a substantial loss.

Coal Age Index of spot prices on bituminous coal for March 1 was 169 and the corresponding price was \$2.04, as compared with an index number of 170 and a price of \$2.06 on Feb. 22. This week's index number is the same as that in effect a year ago, when the outlook for the industry was anything but promising. During the past week West Virginia low-volatile coals in Eastern markets and southeastern Kentucky block in the Middle West were the chief victims of the price decline.

Production Still on the Downgrade

Bituminous production is being curtailed to meet the new conditions. The output for the week ended Feb. 20 was estimated by the Bureau of Mines at 11,513,000 net tons, as compared with 12,011,000 tons the week preceding. Preliminary figures for last week indicate a further decline. Notwithstanding these drastic cuts, there is still considerable coal on wheels which can be sold only at bargain-counter figures. And "no bills" are the common lot of most producing fields.

The greatest danger in connection with this unsold and rejected tonnage is not the losses that will be suffered to effect disposition, but the false basis of values such distress sales will establish in the minds of many buyers. Coming at the time when the question of contract renewals is pushed to the front, such a false basis

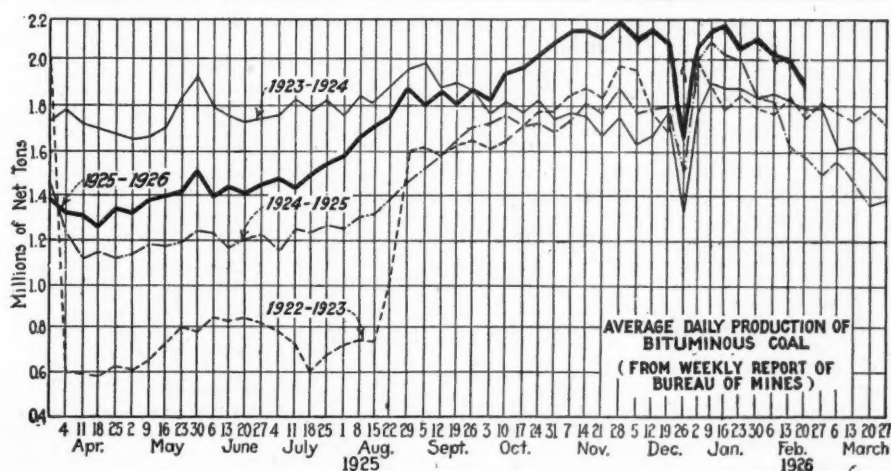
may have a disastrous effect upon next year's business. As a matter of fact, in some cases buyers are holding off from renewing contracts apparently with just such an idea in mind.

Look to Lake Trade for Relief

To the Appalachian Region the most favorable factor in the present situation is the approach of the opening of navigation. One or two troublesome accumulations of tonnage have been moved to boats tied up at the lower ports. This has been a great help to the high-volatile coals. The low-volatile producers, however, have not been able to arouse the interest of lake buyers. In both high- and low-volatile fields, jockeying for prices between buyer and seller already has started.

The anthracite situation is paradoxical. The householder is eager to take in hard coal, but the eastern retailers, particularly in the metropolitan areas, are more concerned with getting rid of the stocks of "substitute" fuels still in their yards. The result is that, while shipments are readily absorbed—possibly because the tonnage is spread so thinly over a wide territory—there is no pressure upon the producers for quick deliveries. In fact, some representatives of the producers complain that the market lacks life. Extravagant premiums on independent tonnage are fading out of the picture, although the range over company circulars is still high.

Domestic interest in beehive coke is largely history. Production in the Connellsville region is declining in spite of increased buying by industrial interests. Some of the byproduct ovens which stepped into the market during the hard-coal strike, however, are laying plans to hold part at least of the business then enjoyed.



Estimates of Production

(Net Tons)

BITUMINOUS

	1925	1926
Feb. 6	10,910,000	12,167,000
Feb. 13 (a)	9,758,000	12,011,000
Feb. 20	9,464,000	11,513,000
Daily average	1,577,000	1,919,000
Coal yr. to date . . . (c)	424,651,000	483,706,000
Daily av. to date . . .	1,552,000	1,763,000

ANTHRACITE

Feb. 6	1,909,000	27,000
Feb. 13 (a)	1,824,000	35,000
Feb. 20	1,838,000	406,000
Coal yr. to date. . . . (c)	77,558,000	41,122,000

BEEHIVE COKE

Feb. 13 (a).....	265,000	362,000
Feb. 20 (b).....	259,000	353,000
Cal. yr. to date.....	(c) 2,461,000	1,928,000

(a) Revised since last report. (b) Subject to revision. (c) Adjusted to equalize number of days in the two years.

Middle Western Mines Closing

With winter demand apparently on its last legs, the number of mines in Illinois and Indiana closing down or reducing running time is on the increase. An unofficial check of the situation shows more mines down in the two states than at any time, barring general strike periods, in the past five years. "No bills" are no respecters of sizes in either state.

According to present plans, most of the southern Illinois operators will try to hold to the \$3 base on lump this month. Pressure from outside coals, however, is severe. West Virginia and eastern Kentucky high-volatiles are easy at \$2.50. Smokeless lump is reasonably firm at \$3.50@3.75; egg and nut, \$4@4.25, and mine-run, \$2@2.35.

The Middle Western steam market is exceedingly quiet. Neither the reduced output of coal as a result of the resumption of anthracite production nor the shutting off of tonnage by strikes in southern Indiana has strengthened

steam coal prices. Railroad buying in southern Illinois is light. Stripping operations are gathering in some spot orders for locomotive fuel as these mines are willing to compete on a price basis with non-union western Kentucky.

There is no change in the situation in the Duquoin and Jackson County fields. Railroad buying is the mainstay of current business in the Mt. Olive district. With that exception, conditions are on all fours with those in southern Illinois. Mines in the Standard area still pursue a ruinous price policy, but this has little effect upon the accumulation of "no bills" and some operations plan to shut down for an extended period.

The St. Louis local market is "flat, stale and unprofitable." High-grade coals lag in demand. Many retail distributors have been forced to enter into the building materials business to keep out of red ink. Country domestic trade is no better than that in the city and steam movement is light.

Undigested Surplus Pains Kentucky

The collapse of the Eastern market for domestic coal leaves the central states with an undigested surplus of Kentucky and West Virginia high-volatile tonnage. Although consignment shipments are held down to a minimum, the potential capacity of the mines depresses spot prices—particularly upon prepared sizes. The chances are that there will be little advance until the opening of the lake season.

Screenings, on the other hand, are moving to higher levels under the influence of curtailed production. Industrial consumers are showing more interest in the market. Eastern Kentucky slack commands 90c.@\$1.10 and screenings from the western part of the state sell for 10c. less. High-grade eastern Kentucky block is easy at \$2.25@2.75; lump, \$2@2.50; egg and nut, \$1.75@2; mine-run, \$1.35@1.50. Western Kentucky block is \$1.75@2; lump and egg, \$1.50@1.75; nut and mine-run, \$1.25@1.50.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern		Market Quoted	Mar. 2 1925	Feb. 15 1926	Feb. 22 1926	Mar. 1 1926†
Smokeless lump.....	Columbus....	\$3.60	\$4.60	\$4.35	\$4.25@4.50	
Smokeless mine run.....	Columbus....	1.90	2.55	2.50	2.25@2.50	
Smokeless screenings.....	Columbus....	1.15	1.85	1.60	1.00@1.50	
Smokeless lump.....	Chicago....	3.10	4.50	4.10	4.00@4.25	
Smokeless mine run.....	Chicago....	1.75	2.10	2.10	2.00@2.25	
Smokeless lump.....	Cincinnati....	3.25	4.25	4.35	3.75@4.25	
Smokeless mine run.....	Cincinnati....	2.00	2.35	2.35	2.00@2.25	
Smokeless screenings.....	Cincinnati....	1.35	1.25	1.35	1.10@1.50	
*Smokeless mine run.....	Boston....	4.30	5.00	4.85	4.60@4.85	
Clearfield mine run.....	Boston....	2.05	2.15	2.00	1.90@2.25	
Cambria mine run.....	Boston....	2.25	2.45	2.30	2.10@2.75	
Somerset mine run.....	Boston....	2.05	2.30	2.10	2.00@2.35	
Pool 1 (Navy Standard).....	New York....	2.65	3.05	3.05	2.75@3.10	
Pool 1 (Navy Standard).....	Philadelphia....	2.80	3.20	2.90	2.70@3.15	
Pool 1 (Navy Standard).....	Baltimore....	2.25	2.30	2.30	2.25@2.30	
Pool 9 (Super. Low Vol.).....	New York....	2.05	2.60	2.55	2.25@2.50	
Pool 9 (Super. Low Vol.).....	Philadelphia....	2.20	2.70	2.45	2.30@2.60	
Pool 9 (Super. Low Vol.).....	Baltimore....	1.85	2.15	2.15	2.00@2.20	
Pool 10 (H.Gr. Low Vol.).....	New York....	1.75	2.30	2.30	2.00@2.25	
Pool 10 (H.Gr. Low Vol.).....	Philadelphia....	1.85	2.40	2.15	2.00@2.30	
Pool 10 (H.Gr. Low Vol.).....	Baltimore....	1.70	1.95	1.95	1.85@1.90	
Pool 11 (Low Vol.).....	New York....	1.55	2.10	2.10	1.80@2.00	
Pool 11 (Low Vol.).....	Philadelphia....	1.65	2.25	1.95	1.90@2.00	
Pool 11 (Low Vol.).....	Baltimore....	1.50	1.70	1.75	1.70@1.80	
High-Volatile, Eastern		Market Quoted	Mar. 2 1925	Feb. 15 1926	Feb. 22 1926	Mar. 1 1926†
Pool 54-64 (Gas and St.).....	New York....	1.50	1.60	1.60	1.50@1.70	
Pool 54-64 (Gas and St.).....	Philadelphia....	1.50	1.65	1.60	1.50@1.70	
Pool 54-64 (Gas and St.).....	Baltimore....	1.65	1.65	1.75	1.50@1.60	
Pittsburgh se'd gas.....	Pittsburgh....	2.50	2.65	2.65	2.40@2.60	
Pittsburgh gas mine run.....	Pittsburgh....	2.20	2.10	2.10	2.00@2.25	
Pittsburgh gas mine run (St.).....	Pittsburgh....	1.95	2.05	2.05	2.00@2.10	
Pittsburgh slack (Gas).....	Pittsburgh....	1.30	1.20	1.05	1.15@1.25	
Kanawha lump.....	Columbus....	2.35	2.25	2.25	2.00@2.50	
Kanawha mine run.....	Columbus....	1.50	1.55	1.55	1.40@1.70	
Kanawha screenings.....	Columbus....	.75	.65	.60	.50@.75	
W. Va. lump.....	Cincinnati....	2.10	2.50	2.25	2.00@2.50	
W. Va. gas mine run.....	Cincinnati....	1.35	1.45	1.50	1.40@1.60	
W. Va. steam mine run.....	Cincinnati....	1.25	1.25	1.30	1.25@1.40	
W. Va. screenings.....	Cincinnati....	1.00	.75	.85	.60@1.00	
Hooking lump.....	Columbus....	2.40	2.50	2.50	2.25@2.75	
Hooking mine run.....	Columbus....	1.50	1.65	1.50	1.35@1.70	
Hooking screenings.....	Columbus....	1.10	1.05	.90	.85@1.10	
Pitta. No. 8 lump.....	Cleveland....	2.30	2.30	2.30	1.90@2.75	
Pitta. No. 8 mine run.....	Cleveland....	1.80	1.85	1.85	1.85@1.90	
Pitta. No. 8 screenings.....	Cleveland....	1.35	1.00	1.10	1.05@1.15	
Midwest		Market Quoted	Mar. 2 1925	Feb. 15 1926	Feb. 22 1926	Mar. 1 1926†
Franklin, Ill. lump.....	Chicago....	\$3.10	\$3.00	\$3.00	\$3.00	
Franklin, Ill. mine run.....	Chicago....	2.35	2.50	2.40	2.35@2.50	
Franklin, Ill. screenings.....	Chicago....	1.90	1.55	1.55	1.40@1.75	
Central, Ill. lump.....	Chicago....	2.85	2.60	2.60	2.50@2.75	
Central, Ill. mine run.....	Chicago....	2.20	2.10	2.10	2.00@2.25	
Central, Ill. screenings.....	Chicago....	1.85	1.10	1.10	1.00@1.25	
Ind. 4th Vein lump.....	Chicago....	2.85	2.85	2.85	2.75@3.00	
Ind. 4th Vein mine run.....	Chicago....	2.35	2.30	2.30	2.25@2.35	
Ind. 4th Vein screenings.....	Chicago....	1.80	1.70	1.70	1.65@1.75	
Ind. 5th Vein lump.....	Chicago....	2.50	2.35	2.15	2.00@2.35	
Ind. 5th Vein mine run.....	Chicago....	2.10	1.95	1.95	1.85@2.10	
Ind. 5th Vein screenings.....	Chicago....	1.60	1.10	1.15	1.10@1.25	
Mt. Olive lump.....	St. Louis....	2.85	2.75	2.75	2.75	
Mt. Olive mine run.....	St. Louis....	2.35	2.15	2.15	2.15	
Mt. Olive screenings.....	St. Louis....	1.75	1.40	1.40	1.40	
Standard lump.....	St. Louis....	2.50	2.50	2.50	2.50	
Standard mine run.....	St. Louis....	1.80	1.80	1.80	1.75@1.85	
Standard screenings.....	St. Louis....	1.40	.80	1.15	1.10@1.25	
West Ky. block.....	Louisville....	2.25	2.00	2.00	1.75@2.00	
West Ky. mine run.....	Louisville....	1.35	1.25	1.35	1.25@1.50	
West Ky. screenings.....	Louisville....	1.25	.75	.85	.80@1.00	
West Ky. block.....	Chicago....	2.35	2.35	2.05	1.85@2.25	
West Ky. mine run.....	Chicago....	1.35	1.50	1.50	1.25@1.75	
South and Southwest		Market Quoted	Mar. 2 1925	Feb. 15 1926	Feb. 22 1926	Mar. 1 1926†
Big Seam lump.....	Birmingham..	2.25	2.75	2.35	2.25@2.50	
Big Seam mine run.....	Birmingham..	1.75	1.85	1.75	1.50@2.00	
Big Seam (washed).....	Birmingham..	1.75	2.10	2.10	2.00@2.25	
S. E. Ky. block.....	Chicago....	2.60	2.60	2.60	2.25@3.00	
S. E. Ky. mine run.....	Chicago....	1.50	1.85	1.85	1.75@2.00	
S. E. Ky. block.....	Louisville....	2.35	2.75	2.75	2.25@3.00	
S. E. Ky. mine run.....	Louisville....	1.35	1.55	1.55	1.35@1.50	
S. E. Ky. screenings.....	Louisville....	.90	.75	.80	.90@1.10	
S. E. Ky. block.....	Cincinnati....	2.35	2.50	2.35	2.00@2.50	
S. E. Ky. mine run.....	Cincinnati....	1.40	1.35	1.40	1.25@1.75	
S. E. Ky. screenings.....	Cincinnati....	1.05	.75	.85	.50@1.00	
Kansas lump.....	Kansas City..	4.75	4.75	4.50	4.50	
Kansas mine run.....	Kansas City..	3.10	3.10	2.85	2.75@3.00	
Kansas screenings.....	Kansas City..	2.50	2.30	2.40	2.35@2.50	

* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type; declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

		Market Quoted	Freight Rates	March 2, 1925		Feb. 22, 1926		March 1, 1926†	
				Independent	Company	Independent	Company	Independent	Company
Broken.....	New York.....	\$2.34			\$8.00@9.25	\$9.00@10.50	\$8.25@9.25	\$9.00@14.50	\$8.25@9.25
Broken.....	Philadelphia....	2.39			9.15	9.00@10.50	8.25@9.25	9.00@12.50	9.00@9.25
Egg.....	New York.....	2.34		\$8.50@9.00	8.75@9.25	9.25@15.00	8.75@9.25	9.25@14.00	8.75@9.25
Egg.....	Philadelphia....	2.39		9.25@9.75	8.80@9.25	9.25@10.40	8.75@9.25	9.25@12.50	9.15@9.25
Egg.....	Chicago*.....	5.06		8.17@8.40	8.08				8.13
Stove.....	New York.....	2.34		8.75@10.00	9.00@9.50	9.60@15.00	9.25@9.50	9.60@14.00	9.25@9.50
Stove.....	Philadelphia....	2.39		9.40@10.40	9.15@9.50	9.60@10.65	9.25@9.50	9.60@12.50	9.35@9.50
Stove.....	Chicago*.....	5.06		8.80@9.00	8.53@8.65				8.33@8.58
Chestnut.....	New York.....	2.34		8.75@10.00	8.75@9.40	9.25@15.00	8.75@9.15	9.25@14.00	8.75@9.15
Chestnut.....	Philadelphia....	2.39		9.40@10.30	9.25@9.40	9.25@10.40	8.75@9.15	9.25@12.50	9.00@9.15
Chestnut.....	Chicago*.....	5.06		8.61@9.00	8.40@8.41				8.33@8.53
Pea.....	New York.....	2.22		4.50@5.50	5.50@6.00	6.50@8.50	6.00@6.35	6.50@9.00	6.00@6.35
Pea.....	Philadelphia....	2.14		5.25@6.00	6.00	6.50@7.00	6.00@6.35	6.50@7.50	6.00@6.50
Pea.....	Chicago*.....	4.79		5.36@5.75	5.36@5.95				5.65@5.80
Buckwheat No. 1.....	New York.....	2.22		2.00@2.75	3.00@3.15	4.00@5.50	3.00@3.50	3.00@5.00	3.00@3.50
Buckwheat No. 1.....	Philadelphia....	2.14		2.25@3.00	3.00	3.50@4.25	3.00@3.50	3.00@3.50	3.00
Rice.....	New York.....	2.22		1.80@2.25	2.00@2.25		2.00@2.25	2.25@3.00	2.00@2.25
Rice.....	Philadelphia....	2.14		1.70@2.25	2.25	2.25@2.75	2.00@2.25	2.25	2.25
Barley.....	New York.....	2.22		1.35@1.50	1.50		1.60@1.75	1.75@2.50	1.60@1.75
Barley.....	Philadelphia....	2.14		1.50	1.50	1.75@2.50	1.60@1.75	1.75	1.75
Birdseye.....	New York.....	2.22		1.35@1.60	1.60		2.00		2.00

* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type; declines in italics.

Mild weather the last half of February cut into shipments from the docks at the Head of the Lakes to such an extent that some of the plants were on a part-time basis. Industrial demand did not wholly escape the slump, but the slackening in this department of the trade was attributed to heavy buying in earlier weeks. An expansion in steam-coal business is expected this month.

"Substitutes" Still Moving from Docks

The end of the anthracite strike has had little effect upon the movement of Pocahontas and other "substitute" fuels from the docks. Present stocks are large, but dock operators still believe that there will be little left unsold when navigation opens. Docks, however, are planning to bring up the normal quantities of hard coal the coming year.

Dock quotations on all coals are firmly held. There is a real shortage in screenings. Some operators have been compelled to buy from competing docks to take care of contracts. Stocks of all sizes on hand on March 1 were estimated at 3,232,000 tons.

The market at the Twin Cities is colorless. Supplies are free and there is no rush to accumulate tonnage. Consumers, both domestic and industrial, are going on the theory that, with the hard-coal strike over, there will be plenty of coal for everybody. All-rail southern Illinois lump is quoted at \$3 mines; central Illinois, \$2.50; western Kentucky, \$1.90.

Milwaukee in a Slump

Bituminous demand is easing up at Milwaukee. Prices on low-volatile coal are softening, but this weakness has not, as yet, extended to retail quotations. Some anthracite has been received and is being sold at pre-strike prices.

The domestic market in the Southwest has faded away and Kansas operations now are down to two and three days a week. There has been some reduction in the number of unbilled loads of screenings and about one-third of the "no-bills" of prepared have been moved. Arkansas industrial demand is light; domestic business is a closed incident. Less than a dozen mines in the Henryetta field are working.

Decreased domestic buying has cut Colorado operations to a 70 per cent basis. Conditions otherwise are unchanged. Utah, too, suffers from mild weather, but the predicted acute shortage in slack coal has not made its appearance although the situation is tight. Prices, generally speaking, are well maintained. The number of idle miners is growing.

Look to Lakes for Relief

High-volatile producers with headquarters at Cincinnati are looking to the lakes for relief from existing unsatisfactory market and production conditions. Some orders for 2-in. lump and slack already have been placed—principally with southeastern Kentucky mines. Quotations still show a wide spread, lump ranging from \$2 to \$2.50 and slack from 60c. to \$1.

On the other hand, lake buyers are turning a cold shoulder to offerings of low-volatile coals at prevailing quota-

tions. These figures, released last Saturday, show Pocahontas lump at \$4; egg, stove and nut, \$4@4.25, and mine-run, \$2.25. Some spot New River lump is available at \$3.75@4.

Movement through the Cincinnati gateway has increased only slightly. The latest car interchange report of the American Railway Association shows 12,357 cars interchanged, or 227 loads more than in the preceding week. The number of empties sent to the mines declined 2,122.

Cincinnati retail business is off with a good start for March. Prices show no material change from February levels. Smokeless lump is \$8.50; mine-run, \$6.50; high-volatile lump, \$6.25@6.50; slack, \$4@4.50. River business is coming back into its own with warmer weather. Most of the boats are back on their regular schedules.

Central Ohio Trade Marks Time

Basic conditions in the central Ohio trade are unchanged. Domestic demand is affected adversely by weather conditions. Retail prices, however, are firm and Columbus dealers have enjoyed one of the best years in their history. The spot steam market is extremely sluggish. Unsold tonnage at mines and junction points has reached

uncomfortable proportions. No real relief is expected before the opening of the lake season.

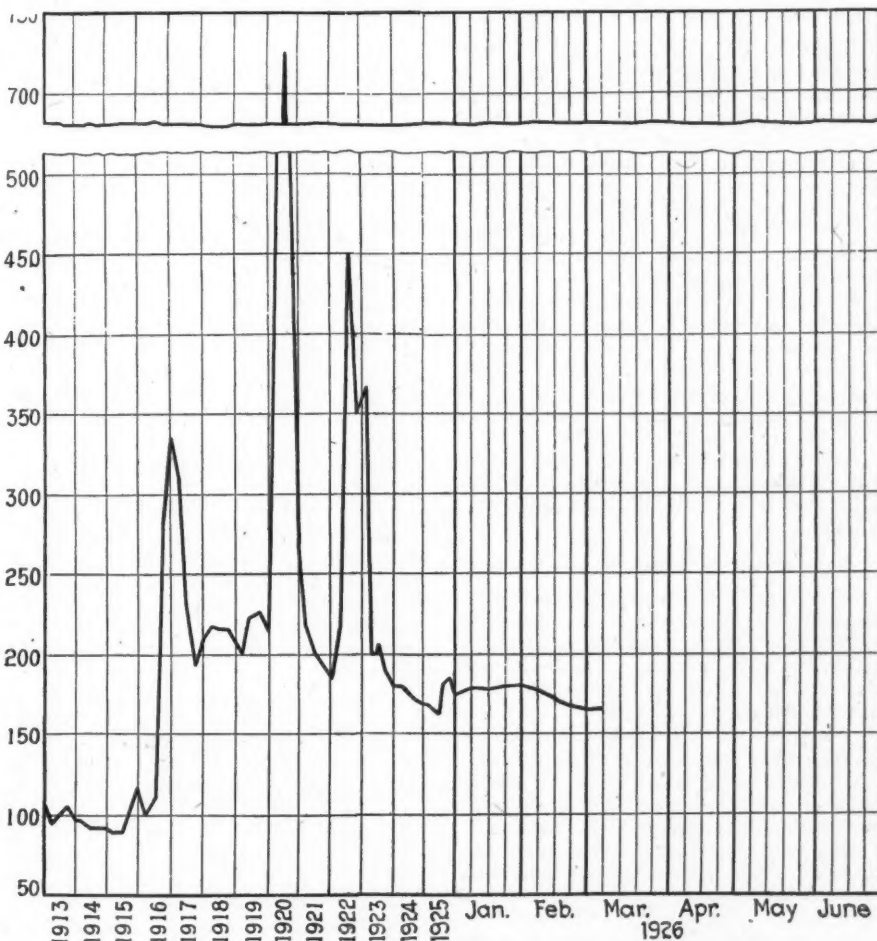
Contracting is still in the inquiry stage, except for a few short-term agreements. It is not considered likely that contract figures will show much change from last year, when mine-run was signed up at \$1.35@1.75.

Southern Ohio production is not averaging over 18 per cent of capacity. As for several months past, the Pomeroy Bend district has been the most favored.

Depression rules in the Cleveland market, but prices are unchanged, except for distress lots of prepared sizes. Screenings, however, are in fair demand because of declining production. Output from the No. 8 field during the week ended Feb. 20 approximated 248,000 tons, or 35 per cent of capacity. This was 12,000 tons under the output for the preceding week and 5,000 tons less than in 1925. More mines are closing down.

Pittsburgh Market Weakens

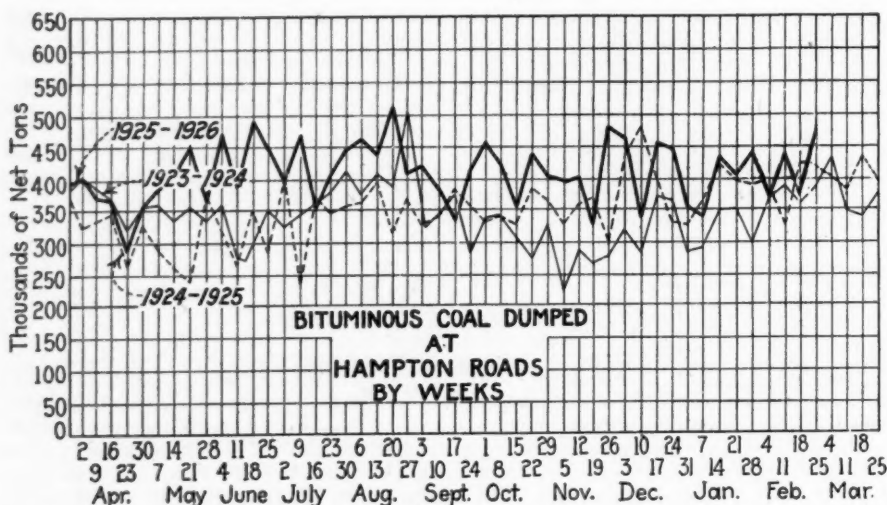
"No bills" have been added to the woes of the Pittsburgh producers. Egg and nut are offered as substitutes for mine-run and domestic lump is seeking lower levels. Industrial buyers are



Coal Age Index of Spot Prices of Bituminous Coal F.O.B. Mines

	1926				1925	1924
Index	Mar. 1	Feb. 22	Feb. 15	Feb. 8	Mar. 2	Mar. 3
Weighted average price	169	170	173	177	169	183
	\$2.04	\$2.06	\$2.10	\$2.14	\$2.04	\$2.21

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States, weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke: 1913-1918," published by the Geological Survey and the War Industries Board.



holding back orders, presumably in the hope that non-union offerings will break the market.

Three-quarter Youghiogheny gas is off 20@25c. Competition from the Connellsville field is the explanation advanced for this weakening. Slack prices, however, are growing stronger as production declines. Steam slack is up 10c. and gas slack, 15c.

Central Pennsylvania Loadings Off

Daily loadings in the central Pennsylvania field have dropped from 3,800 to 3,600 cars since the resumption of hard-coal mining. This loss is much less than was expected. "E" and "D" seams in Huntingdon, Bedford, Cambria, Blair and Somerset counties are quoted at \$1.95 on contract and \$2.25 for spot sales. "C" prime is \$2 on contract and \$2.30 spot. "B" Miller Seam is \$2.30 on contract and \$2.65 on spot.

In Clearfield, Centre and Clinton counties, "E" and "D" seams bring \$1.90 on contract and \$2.15 on spot sales. "B" seam is \$2.25. Indiana County "E" and "D" seam coals are \$1.85 on contract and 15c. higher on spot sales. "B" seam brings \$2 and \$2.30.

The Buffalo market is still in a watchful waiting mood. Business is unusually quiet. Nominal quotations are unchanged.

New England Turns to Anthracite

A full week of anthracite mining has sapped the New England bituminous market of the last traces of strength. Mine-run, as well as prepared coals, has settled into a rut and no early improvement is in prospect. There still is considerable prepared bituminous en route, which probably will go at a sacrifice. Recent quotations: Egg is offered well under \$4 and \$3.25 seems to be the top obtainable on lump.

Navy Standard coals command \$4.70 @ \$4.85 gross f.o.b. Norfolk and Newport News. Less favorably known coals sell down to \$4.60. With the outlet for screened sizes more restricted, reductions in the accumulations of tonnage at the piers will be in order. Industrial and railroad consumption show little change. Coal on cars at Providence and Boston is weaker, recent quotations being off 25c. or more.

Coke, ovoids and Welsh anthracite are still arriving, but the cargoes are received with no great enthusiasm. Several of the Boston retailers are trying

to get rid of stocks of foreign fuel already on hand. Price cuts have not been potent in persuading the householder to buy freely of these fuels.

Distress Coal Rules New York

How to dispose of distress coal is the chief problem of the New York bituminous market at the present time. Long Island R.R. tracks are crowded with low-volatile coal and coke, many cars of which have been refused. The market for screened bituminous has practically disappeared, but retailers say that the cargoes of British and German coal and coke still arriving are being readily absorbed.

Mine-run also is inactive. Receipts at tidewater piers have been heavy enough to maintain a daily average of nearly 4,500 cars of coal on tracks, but deliveries have been so slow that serious congestion has ensued.

Coke is gradually dropping both in demand and in price. Sized coke, which was held at \$14 f.o.b. ovens before the anthracite strike was settled is now offered at \$5@6. Retail prices have dropped from \$25 to \$15 per ton. Some ovens are planning educational campaigns to hold part of their strike trade.

Philadelphia Market Lethargic

The Philadelphia bituminous market is soft and slow. Spot buyers seem determined to force a bigger break in prices—notwithstanding railroad congestion and delayed deliveries. Producers are turning their attention to

contract renewals. Some of the larger operators are asking \$2.65@2.75, but others are willing to take \$2.35. Buyers, however, are indifferent. The railroads have been able to pick up so much distress tonnage at bargain figures that contract solicitation finds them cold.

Baltimore Market "Flat"

"Flat" is the way the Baltimore bituminous market is described. Prices on the better grades of steam coal show no real change; gas coals have weakened under light demand. Tonnage at tide and in transit is too great to arouse the industrial consumer to buying activity. Prices on prepared sizes are off \$2@3 per ton since the anthracite strike ended. Bunker demand is weak and there is no export business to ease the strain.

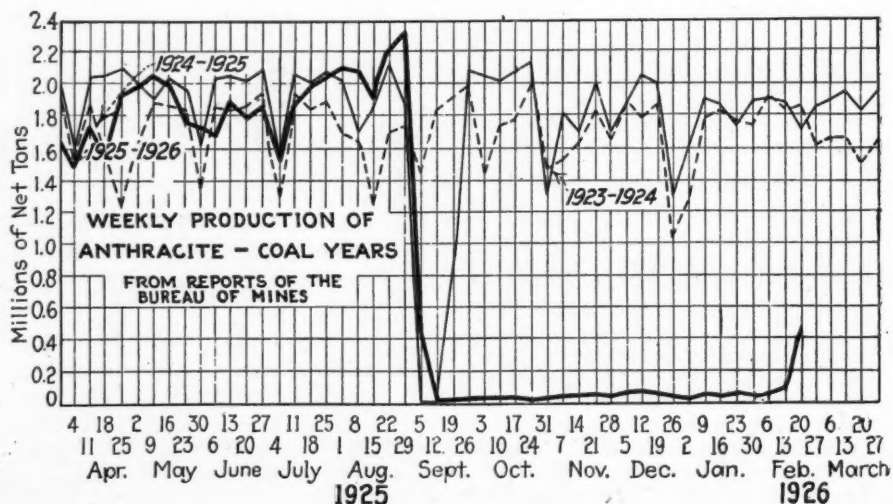
Prices at Hampton Roads slumped 50@75c. last week in belated tribute to the anthracite strike settlement. This slump affected the regular pool classifications. Lump, egg and nut for domestic purposes have dropped \$3.25@3.50 since the strike ended. Dumpings at the piers for the week ended Feb. 25 were 431,980 gross tons, as compared with 322,899 tons the week preceding. The usual month-end rush to avoid demurrage was reflected in this increase.

Fairmont Fears Overproduction

Overproduction is the bugaboo of the Fairmont district. Some sharp reductions in output have been effected, but the market continues to sag. Slack and mine-run are the weakest. The former is quoted at \$1@1.20 on the Monongahela Ry. and mine-run is \$1.25@1.55. Three-quarter lump holds at \$1.60@1.75. Prices at mines on the Western Maryland and Baltimore & Ohio railroads are lower, with slack at 50@90c.

Conditions in the Birmingham coal market last week were a repetition of those controlling the preceding week. Poorer grades of coal moved slowly; higher grades were readily absorbed. Contract consumers took liberal tonnages. On the whole, industrial movement was better than domestic as the latter was hit by the warm weather. General mine quotations were unchanged.

The rising mercury and the end of the anthracite strike have left their impress upon the coke market. Demand still takes care of output, but the prices have weakened. Egg and nut are to be



Car Loadings and Supply

	Cars Loaded		Cars Shortages	
	All Cars	Coal Cars	All Cars	Coal Cars
Week ended Feb. 13, 1926....	917,144	171,903		
Preceding week.....	914,904	175,964		
Week ended Feb. 14, 1925....	902,877	170,596		
	Surplus Cars		Car Shortages	
	All Cars	Coal Cars	All Cars	Coal Cars
Feb. 15, 1926	232,031	90,604		
Feb. 7, 1926	240,424	93,207		
Feb. 14, 1925	220,798	84,602		

had at \$5.50 ovens, as compared with \$6.50@7 three weeks ago. Foundry coke is \$6.50@7 for spot tonnage, with consumption and production about balanced.

No Pressure on Anthracite

The anthracite market at New York is a paradox. Retailers are so anxious to rid themselves of the substitute fuels still on hand that they are making no frantic demands on hard-coal shippers. Nevertheless, independent operators experience no difficulty in selling domestic sizes at \$12@14 in straight lots and at \$12 for egg, stove and chestnut in combination with broken coal. Pea coal is still somewhat scarce and is held at \$7.50@9. Retail prices range from \$14.95 on egg and nut to \$15.50 for stove.

Spot demand for steam sizes is held down by the surplus of bituminous mine-run available at low prices. Most of the steam tonnage coming in is being applied on existing contracts. Free independent No. 1 buckwheat is quoted at \$3.65@5; rice, \$2.50@3; barley, \$2@2.50, mines. Culm was quoted at \$4.30 f.o.b. piers the close of last week.

Receipts of domestic anthracite at Philadelphia last week exceeded expectations. Independent prices, too, are working lower. Starting out in some cases \$6 above company circular, prices have come down to \$1.50@3 above company figures, with little moving at the higher premiums. Retail prices are still an uncertain quantity, but the average basis is around \$15.75 for egg

and nut, \$16 for stove, \$12 for pea and \$8 for buckwheat, curb delivery.

Cut Retail Prices on Substitutes

In an effort to move stocks of screened bituminous coal and coke on hand, Philadelphia retailers are offering these fuels to the consumer at \$2@3 under cost prices. Demand, however, has dropped off sharply. The wholesale market in the buckwheats presents no unusual feature.

Baltimore dealers are fighting shy of independent domestic anthracite at \$9.50 @ \$14.50, mines. Although the household appears to have little coal of any kind on hand, the retail distributors are hopeful that company tonnage will be coming in in normal quantities before any pinch develops.

Anthracite demand at Buffalo has been less heavy than local representatives of the shippers had banked upon. But the steady flow of hard coal has ended the dreams of the bituminous producers and bargain prices induce no buying. Coke prices have dropped \$6 in the fight of the ovens to hold on to some of the business they had.

Connellsville Seeks Its Level

Optimists in the Connellsville region are trying to convince themselves that the price liquidation program has been completed. There are so many operators who have not blown out their ovens, however, that an awkward accumulation of crushed coke seems unavoidable. There has been a light demand from eastern retail interests and some of the industrial buyers have come back into the market.

Straight furnace coke dropped 25c. last week, bringing the price level to \$3.75@4. Yard crushed coke is \$4.50 @ \$5. Foundry coke is \$5@5.50, with a fair volume of buying.

The Connellsville *Courier* reports coke output in the Connellsville and Lower Connellsville regions the week ended Feb. 20 at 110,700 tons from the furnace ovens and 121,460 tons from the merchant ovens. Compared with

the preceding week furnace oven output decreased 9,500 tons; merchant oven production, 3,400 tons.

Imports Into United States Almost Double

Coal and coke imports into the United States last year were nearly double those of 1924, but little more than half the total reached in 1923. The greatest proportionate increases were in imports of anthracite coal and coke from the United Kingdom. Sharp increases in movement the last quarter of the year swelled the totals. In December alone, the United States imported 146,700 gross tons of anthracite from Great Britain, as compared with a monthly average for the year of 28,500 tons.

Exports of anthracite from the United Kingdom to Canada also have increased, as shown by figures obtained from Consul A. B. Cooke, Swansea, Wales. Exports from Swansea consular district to Canada in 1925 totaled 364,073 tons, as compared with 215,995 in the foregoing year. Exports to the United States, as stated by Consul Cooke, amounted to 230,388 tons in 1925 and 79,641 in 1924.

IMPORTS OF COAL AND COKE

	Gross Tons		
	1923	1924	1925
Bituminous:			
Canada.....	981,940	238,200	471,238
United Kingdom.....	574,602	25,166	35,918
Japan.....	20,086	25,824	15,348
Australia.....	80,247	35,646	9,749
Others.....	23,755	47,687	5,037
Total.....	1,680,630	372,523	537,290
Anthracite:			
United Kingdom.....	239,384	88,529	284,457
Germany.....			32,711
Canada.....	17,070	14,507	6,102
Netherlands.....		400	5,790
Belgium.....			5,075
Others.....	11,725	1,877	7,735
Total.....	268,179	105,313	341,870
Coke:			
United Kingdom.....	43,424	41,746	100,218
Canada.....	32,470	22,932	46,591
Netherlands.....		4,246	15,354
Germany.....		5,034	13,792
Others.....	1		4,026
Total.....	75,895	73,958	179,981
Total coal and coke..	2,024,704	551,794	1,059,141

Coal Produced in Ohio in 1924

(Exclusive of Product of Wagon Mines.)

County	Net Tons			Value	Number of Employees a			Average Number of Days per Man Worked	Average Tons per Day
	Loaded at Mines for Shipment	Sold to Local Trade and Used By Employees	Used at Mines for Steam and Heat		Underground	Surface	Total		
Athens.....	2,905,252	66,770	52,893	3,024,915	5,273	1,425	6,698	101	4.03
Belmont.....	10,425,106	415,433	93,571	10,934,110	8,784	2,369	11,153	182	4.90
Carroll.....	183,802	107,379	4,575	295,756	307	106	413	151	4.11
Columbiana.....	323,111	40,016	5,811	368,938	529	221	750	103	4.14
Coshocton.....	151,894	36,035	1,599	189,528	290	94	384	122	3.59
Guernsey.....	2,436,503	139,510	61,192	2,637,205	2,460	1,036	3,496	141	4.95
Harrison.....	2,464,261	9,512	60,907	2,534,680	705	229	934	144	9.33
Hocking.....	682,140	71,766	2,306	756,212	1,055	275	1,330	107	4.61
Holmes.....		18,428	40	18,468	27	5	32	188	2.80
Jackson.....	81,824	67,156	4,410	153,390	321	111	432	96	3.24
Jefferson.....	3,801,751	576,086	25,145	4,402,982	3,655	1,244	4,899	153	5.01
Lawrence.....	2,417	108,579	179	111,175	124	37	161	221	2.87
Mahoning.....	286	43,906	60	44,252	67	10	77	177	2.95
Medina, Portage, and Summit.....	63,183	18,307	10,897	92,387	85	40	125	209	2.78
Meigs.....	184,595	47,399	2,420	234,414	952	286	1,238	42	4.07
Morgan, Noble, Scioto, and Washington.....	652,215	9,338	15,210	676,763	640	343	983	157	4.05
Muskingum.....	325,766	68,901	5,167	399,834	420	90	510	123	4.72
Perry.....	1,831,848	73,182	23,809	1,928,839	2,034	567	2,601	128	4.64
Stark.....	118,225	304,451	5,406	428,082	426	106	532	194	3.59
Tuscarawas.....	699,264	434,265	4,568	1,138,097	1,115	313	1,428	162	4.28
Vinton.....	65,308	24,110	1,892	91,310	170	55	225	98	3.58
Wayne.....	6,200	5,036	434	11,670	42	4	46	108	2.26
Total.....	27,404,951	2,685,565	382,491	30,473,007	29,481	8,966	38,447	143	4.82

a Note that figures of men employed and days worked do not include mines that operated in 1923 but were idle the entire year 1924; they do include many mines operated for a short time only in 1924. The number of active mines of commercial size in Ohio was 906 in 1923 and 750 in 1924.

b Includes also loaders and shotfirers.

Statistics compiled by U. S. Bureau of Mines.

Foreign Market And Export News

Welsh Industrial Coals In Keen Demand; Tyne Spot Market Sluggish

The outlook in the Welsh steam coal industry continues to improve and prices are firmer, but operators are not ready to sell forward on current rates. Orders are plentiful until late March or early April. Steamers have been somewhat delayed by the recent stormy weather, though tonnage is now arriving regularly.

Shipments have been helped by the improvement of dock facilities, chiefly the reconstruction of the coal hoists to take the new 20-ton cars of the Great Western Ry. In addition to this the trippers and trimmers are working better than for some time past.

A favorable impression has been created by the return of the Paris & Orleans Ry. to the use of Welsh coal and this railway has ordered 150,000 tons of Monmouthshire Black Veins large and Cardiff smalls for shipment up to the end of August. France and Italy are both buying better, and the hope exists that the Italian State Rys. will return to the use of Welsh coals. Inquiries from the United States are few and from South America moderate.

The improvement in Wales is having the opposite effect on the Newcastle market. The collieries are well booked, but merchants are finding some difficulty in getting rid of their stocks and in many cases are selling below colliery quotations. There are few contracts at Newcastle worth reporting, though several orders have come through from European gas works for gas coals up to around 2,000 tons.

Output by British collieries during the week ended Feb. 13, according to a special cable to *Coal Age*, totaled 5,400,000 gross tons, compared with 5,415,000 tons in the preceding week.

Belgian Market Still Gaining

The slow but steady progress in the Belgian coal market continues unchecked, according to reports from Brussels under date of Feb. 11. Domestic coals are holding their position and the industrial coal market is improving more rapidly than had been anticipated.

The greatest improvement is in the Borinage. Increased prices on French

coals, decreased receipts from Holland, lessened competition in coke from Germany and the resumption of metallurgical operations in the Charleroi district all have contributed to quickening activities in the Borinage.

No decision has been reached on prices for small coal consumed by the Belgian State Railways since Nov. 1, 1925. Patent fuel prices, however, were set at 97 fr. for November and December and 100 fr. since Jan. 1, 1926.

February indemnity fuel prices are 5 to 10 fr. above January figures, except on unscreened 25 per cent semi-bituminous coals, which are off 10 fr.

U. S. Coal Exports in January (In Gross Tons)

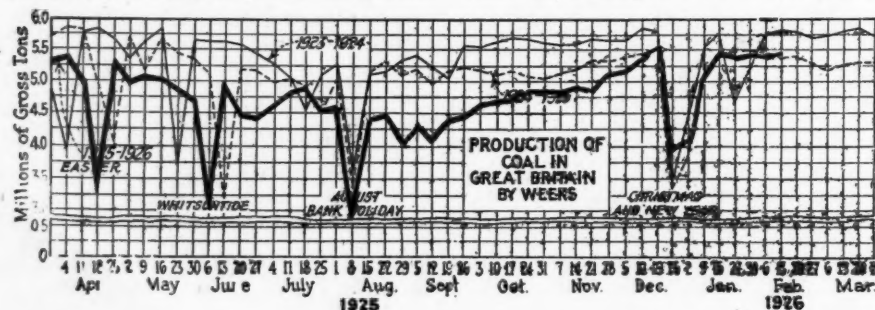
	1925	1926
Anthracite.....	295,799	6,311
Bituminous.....	979,876	993,386
Exported to:		
France.....	11,105	
Italy.....	44,616	94,110
Other Europe.....	3,000	1,138
Canada.....	711,162	724,991
Panama.....	19,366	19,452
Newfoundland and Labrador.....		155
Mexico.....	9,470	8,282
Br. W. Indies.....	13,832	6,865
Cuba.....	52,016	68,456
Fr. W. Indies.....	5,038	12,954
Other W. Indies.....	4,613	12,783
Argentina.....	12,656	10,653
Brazil.....	80,785	9,871
Chile.....	2,998	3,039
Uruguay.....	6,001	
Egypt.....		12,484
French Africa.....		
Other countries.....	3,218	8,153
Coke.....	62,845	81,863

U. S. Coal Imports in January (In Gross Tons)

Coal	1925	1926
Anthracite.....	10,125	135,201
Bituminous coal, shale and lignite, free.....	3,630	17,331
Bituminous coal and shale, dut.....	38,077	37,987
Imported from:		
United Kingdom.....	1,515	9,254
Canada.....	40,185	41,552
Australia.....		4,411
Other countries.....	5	101
Coke.....	6,266	24,509

French Domestic Coal Demand Outstrips Production

Paris, France, Feb. 11.—There has been no break in the French market. Industrial orders are filled without difficulty, but production cannot take care of current domestic demand. Screened flaming gas coals seem to be the shortest in supply. Stocks are being supplemented by purchases of British coal, D. C. B. sorts (corresponding to screened No. 4 of the Pas de Calais), which have jumped 9 fr. in one week.



Wage increases have been granted in the majority of the French producing districts and prices at the pit mouth have been advanced to cover the increase.

French receipts of indemnity fuel from the Ruhr in December were: Coal, 482,700 tons; coke, 288,800; lignite briquets, 32,300 tons. During the first twenty-three days of January, 242,200 tons of coal, 203,700 tons of coke and 25,100 tons of briquets were received. Average daily receipts were approximately 20 per cent less than in the preceding month.

Last year this country produced 48,033,564 metric tons of coal and lignite, as compared with 44,954,567 tons in 1924 and 40,844,218 tons in 1913. The 1925 total includes 5,213,000 tons from Lorraine, which in pre-war years was credited to Germany's output.

Export Clearances, Week Ended Feb. 25, 1926

FROM HAMPTON ROADS		Tons
For Italy:		
Ital. Str. Georgia C., for Naples....		361
Span. Str. Astoi Mendi, for Genoa....		7,189
Ital. Str. Monbaldi, for Genoa....		2,699
Ital. Str. M. T. Cicerone, for Porto Ferrajo.....		9,166
For West Africa:		
Ital. Str. Delia, for Dakar.....		8,066
For British West Indies:		
Nor. Str. Artensis, for Port of Spain		2,493
For Nova Scotia:		
Nor. Str. Dago, for Halifax.....		2,265
For Danish West Indies:		
Dan. Str. Fredensborg, for Curacao..		2,769
For Uruguay:		
Nor. Str. Hesperos, for Montevideo..		6,599
For Cuba:		
Br. Str. Fred Cleaves, for Santiago de Cuba		1,785
For Brazil:		
Br. Str. Rynde, for Para.....		4,895

Hampton Roads Coal Dumpings* (In Gross Tons)

N.&W. Piers, Lamberts Pt.:	Feb. 18	Feb. 25
Tons dumped for week.....	153,768	151,884
Virginia Piers, Sewalls Pt.:		
Tons dumped for week.....	73,718	117,164
C. & O. Piers, Newport News:		
Tons dumped for week.....	95,413	162,932

*Data on cars on hand, tonnage on hand and tonnage waiting withheld due to shippers' protest.

Pier and Bunker Prices, Gross Tons

PIERS				
	Feb. 20		Feb. 27†	
Pool 1, New York.....	\$6.00@	\$6.25	\$6.00@	\$6.25
Pool 9, New York.....	5.50@	5.75	5.40@	5.70
Pool 10, New York.....	5.25@	5.50	5.25@	5.50
Pool 11, New York.....	4.85@	5.25	4.85@	5.25
Pool 9, Philadelphia....	5.30@	5.55	5.30@	5.55
Pool 10, Philadelphia....	5.10@	5.25	5.10@	5.25
Pool 11, Philadelphia....	4.75@	5.00	4.75@	5.00
Pool 1, Hamp. Roads..	5.40@	5.50	4.50@	4.65
Pool 2, Hamp. Roads..	4.90@	5.00	4.20@	4.30
Pools 5-6-7, Hamp. Rds.	4.40@	4.50		4.10
BUNKERS				
Pool 1, New York.....	\$6.25@	\$6.50	\$6.25@	\$6.50
Pool 9, New York.....	5.75@	6.00	5.65@	5.95
Pool 10, New York.....	5.50@	5.75	5.50@	5.75
Pool 11, New York.....	5.10@	5.50	5.10@	5.50
Pool 9, Philadelphia....	5.55@	5.80	5.55@	5.80
Pool 10, Philadelphia....	5.35@	5.60	5.35@	5.60
Pool 11, Philadelphia....	5.00@	5.25	5.00@	5.25
Pool 1, Hamp. Roads..		5.50		4.65
Pool 2, Hamp. Roads..		5.00		4.30
Pools 5-6-7, Hamp. Rds.		4.50		4.15

Current Quotations, British Coal, f.o.b. Port, Gross Tons

Quotations by Cable to <i>Coal Age</i>		Feb. 20	Feb. 27†
Cardiff:			
Admiralty, large.....		23s.6d.	23s. @ 24s.
Steam smalls.....		14s.6d.	12s. @ 13s.
Newcastle:			
Best steams.....		17s.	16s. @ 16s.6d.
Best gas.....		17s.6d.	19s.
Best bunkers.....		17s.	17s.

Advances over previous week shown in heavy type; declines in italics.

Coming Meetings

Fayette-Greene Coal Producers Association. Annual meeting March 6, at Uniontown, Pa. The third annual banquet will be held in the evening at the White Swan Hotel. Secretary, J. Fred Shean, Box 450, Uniontown, Pa.

American Mining Congress. Southern industrial development conference, Hotel Peabody, Memphis, Tenn., March 15-17. Acting secretary, Henry M. Payne, Southern Division, American Mining Congress, Memphis, Tenn.

New England Coal Dealers' Association. Annual meeting at the State Armory, Worcester, Mass., April 7 and 8. Secretary, E. I. Clark, 141 Milk St., Boston, Mass.

American Welding Society. Annual convention at 29 West 39th St., New York City, April 21-23. Secretary, M. M. Kelly, 29 West 39th St., New York City.

National Retail Coal Merchants' Association. Ninth annual convention at the New Willard Hotel, Washington, D. C., May 17-19. Resident vice president, Joseph E. O'Toole, Transportation Bldg., Washington, D. C.

Electric Power Club. Convention at The Homestead, Hot Springs, Va., May 24-27. Secretary, S. N. Clarkson, B. F. Keith Bldg., Cleveland, Ohio.

The American Mining Congress. Annual Exposition of Coal Mining Equipment, May 24-28, at Cincinnati, Ohio, in conjunction with the annual meeting of practical operating officials. Assistant secretary, E. R. Coombes, Washington, D. C.

International Geological Congress. The fourteenth congress will be held in Madrid, Spain, commencing May 24, 1926. From May 5 to 22 excursions of interest to the visiting delegates will be arranged. Information concerning the congress can be obtained from the secretary of the organizing committee, Enrique Dupuy de Lome, Plaza de los Mostenses, 2, Madrid, Spain.

Midwest Retail Coal Merchants Association. Annual meeting, May 25 and 26, at Kansas City, Mo. Secretary, James P. Andriano, St. Joseph, Mo.

Western Canada Fuel Association. Annual meeting at Winnipeg, Manitoba, Can., May 27 and 28. Secretary, W. H. Morrison, Winnipeg.

Association of Iron & Steel Electrical Engineers. Exposition and convention at Hotel Sherman, Chicago, Ill., June 7-10. Secretary, J. F. Kelly, 1007 Empire Bldg., Pittsburgh, Pa.

American Wholesale Coal Association. Annual meeting at Toledo, Ohio, June 7-9. Treasurer, R. B. Starek, Union Fuel Bldg., Chicago, Ill.

American Institute of Electrical Engineers. Annual convention, White Sulphur Springs, W. Va., June 21-25. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

American Society of Mechanical Engineers. Spring convention at San Francisco, Calif., June 28-30. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

American Society for Testing Materials. Convention at Haddon Hall, Atlantic City, N. J., June 21-25. Secretary, C. L. Warwick, 1315 Spruce St., Philadelphia, Pa.

New Companies

The Reichert Coal Co., Freeburg, Ill., has been incorporated with capital of \$20,000 to acquire coal and coal rights and to operate coal mines. The incorporators are W. C. Reichert, Elmer W. Reichert and William J. Reichert.

The Ridge Coal Co., of Mulberry, Kan., with a capital of \$16,000, has been incorporated.

Papers of incorporation for the **Boulder Coal Co.,** Boulder, Colo., have been filed of record by W. J. Quinlan, Melvin G. Gelwicks, C. M. Goddard, and others. The capital is \$50,000. The new coal company will operate mines, including the Black Hawk mine, which will be developed.

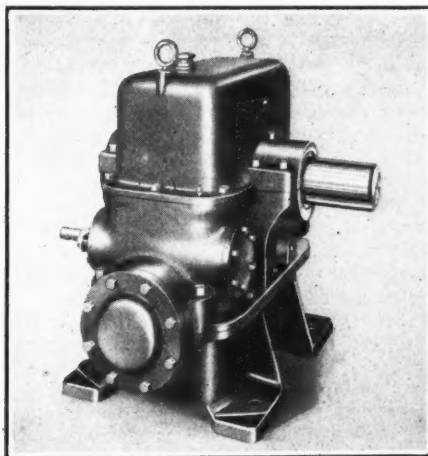
The Monroe Coal Co., Greenville, Ky., capital \$25,000, has been chartered by Henry B. Lee, George T. Collamore, and O. S. Roberts.

New Equipment

Two-step Worm Reduction Gear for Driving Conveyors

Recently the De Laval Steam Turbine Co., Trenton, N. J., has developed a two-step worm reduction gear to provide ratios of from 100 to 1 to 8,000 to 1. The unit which is shown in the accompanying cut is designed for driving conveyors, stokers, heat-treating furnaces, escalators or similar devices. Its gearing consists of an initial worm turning a wheel mounted on the end of an abutting shaft. This shaft carries a second worm which drives the low-speed wheel and shaft.

A single casing carries all bearings



This new two-step worm reduction gear is intended for driving stokers, conveyors, heat-treating furnaces and other similar devices

for the high-speed worm shaft and the low-speed worm shaft, which also carries the high-speed wheel and shaft so as to insure accurate alignment and meshing. The construction is rugged to enable the use of the unit for heavy-duty work. End thrust and bending strains from the driving and the driven machine are taken on flexible couplings of the pin and rubber bushing type.

The casing serves as an oil reservoir, in which oil is maintained at a sufficient level to touch the high-speed wheel and the low-speed worm at all times. In addition to this, the unit is equipped with a positive oil pump by means of which oil is drawn from the reservoir and forced through passages to the low-speed shaft bearings.

Improved Trolley Frog Assures Good Tracking

The type CF overlapping runner trolley frog made by the Westinghouse Electric & Mfg. Co., of East Pittsburgh, Pa., offers several improvements over previous designs. In this improved frog the trolley wheel rides on the runner continuously and never touches the pan. Current is thus always collected in the groove of wheels and not on the flange. The life of both frog and the trolley wheel are thus greatly increased.

This frog possesses exceptionally good tracking qualities as the wheel will follow through without the necessity for slewing the trolley pole by the



Plenty of Clearance Is Assured

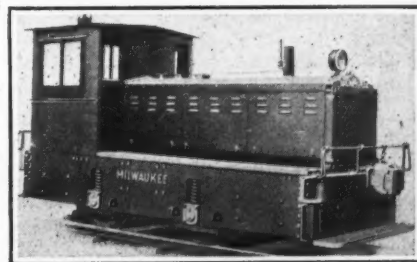
Ample wheel clearance is provided in this design of frog and the wheel makes continuous contact in the groove and not on the flanges. The life of both wheel and frog is thus prolonged.

locomotive driver. It is equipped with renewable bayonet type approaches so that there is an easy transition of the trolley wheel from the wire to the frog body. This is made in either 15- or 20-deg. angles for right-or left-hand turnouts, thus adapting it to practically all points of application in and about the mines.

Two Gasoline Locomotives of 18 and 20-Ton Sizes

The latest addition to the line of gasoline locomotives manufactured by the Milwaukee Locomotive Manufacturing Co. consists of two locomotives of 18 and 20 tons' capacity respectively. These machines are of the four-speed gear and chain drive type, and are geared for four speeds of 2, 4, 6, and 12 m.p.h. both forward and reverse. The machines are built for all gages of track from 30 to 56½ in., and the design of the frame is such that the center of gravity is very low, to steady the locomotives on poorly surfaced track.

It is claimed that the design of the transmission eliminates all possibility of stripping the gears, and as the gears are always in mesh there can be no clashing. All the gears have exceedingly wide faces and are made of chrome-nickel steel forgings, except the



New 18-ton gasoline locomotive

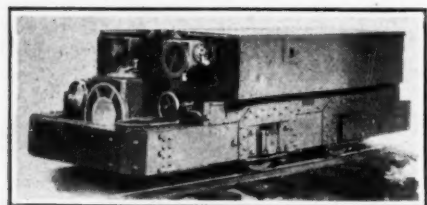
final driving gear and pinion, which are made of steel castings. Removal of the various covers and housings for inspection of the gears and the entire dismantling of the transmission without removing the case proper from the locomotive are features of the design. Driving sprockets on the final drive shaft in the transmission are centrally

located between two bearings, thus providing a rigid and sturdy construction and eliminating the use of a separate jack shaft. Chrome-vanadium roller chains are employed for power transmission.

The locomotive is equipped with hand-operated four-wheel brakes as standard, but also can be equipped with straight or automatic air brakes when specified. A 12-volt electric lighting and starting system consisting of a generator starter and Westinghouse storage battery is used. The engine is a Beaver six-cylinder heavy-duty type, having overhead valves, forced feed oiling, and a maximum speed-regulating governor.

Two Battery Locomotives Put On Permissible List

Two more new type of storage battery locomotives have won the right to bear the official stamp of permissibility. Government approval No. 1,510 was recently granted by the Bureau of Mines to the Jeffrey Manufacturing Co., of Columbus, Ohio. This approval covers a large permissible storage battery locomotive intended for main line haul-



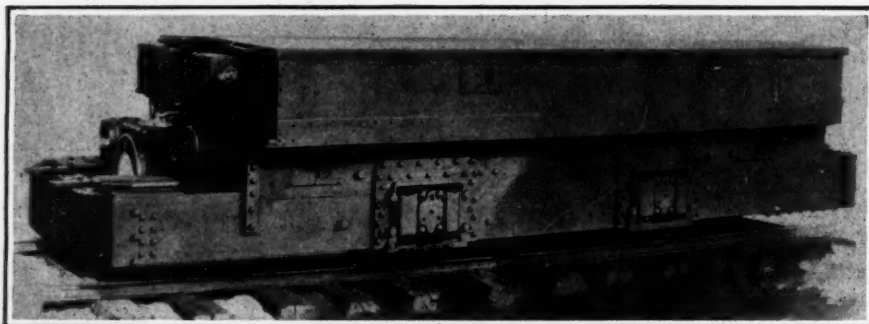
Permissible Gathering Locomotive

This machine is similar in general construction and appearance to the main line haulage locomotive, except that it is smaller. It is fitted with a battery of 64 cells, having a capacity of 60 kw.-hr. It is intended for gathering purposes only.

age. This machine is equipped with two 60-hp., 250-volt motors. The battery consists of 110 lead-plate cells, and has a capacity of 120 kw.-hr.

This new haulage locomotive is built for a 44-in. track gage. The overall width is 78 in. and the overall length 19 ft., 2½ in. The total height is 50½ in. above the rail, and the wheelbase is 70 in. The drivers are 26 in. in diameter and are carried upon 4½-in. axles. The total weight of the locomotive is 18 tons. Machines of this type have a haulage capacity sufficient to permit them to take the place of several compressed air machines.

Government approval No. 1,507 was also granted to the same company, cov-



Large Permissible Storage Battery Haulage Locomotive

This machine weighs 18 tons and is intended for main line haulage. It is provided with 110 lead plate cells and has a capacity of 120 kw.-hr., this being ample for all ordinary haulage purposes.

ering a permissible storage battery gathering locomotive. This machine is equipped with two 15 hp. motors, and the battery consists of 64 lead plate cells having a capacity of 60 kw.-hr.

The dimensions of this machine are as follows: Track gage, 48 in.; total width 72 in.; length 12 ft., 3 in.; overall height 45½ in.; wheelbase 44 in.; diameter of driver 20 in., and diameter of axle 4 in.

Machines of this type are intended for gathering purposes taking the coal to and from the working faces and making them up into trips to be hauled to the tippie or shaft bottom by means of the main haulage machine.

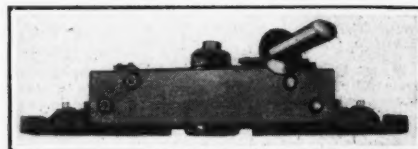
Improved Shoveling Machine With Low Headroom

The new shoveling machine (No. 2-25) recently developed by the Myers-Whaley Co., Knoxville, Tenn., embodies several points of design that make the shovel different from those designs of shovel introduced earlier by the company. This machine is designed for operation in very low headroom. It is only 39 in. high over-all from the rail, and can be operated in headroom as low as 42 in. from the rail. It is a heavy, substantial machine, however, and embodies all improvements which the company has developed up to this time. A roller chain drive is used from the motor to the first shaft instead of a spur-gear drive. This drive is enclosed in oil casing and is noiseless, and the designers think that it will prove very durable. The first machine has been in service for loading rock a short time, and in that service has developed the same capacity as the company's Special No. 3 or Standard No. 3, and is said to have required no repair parts. Indications are that the upkeep on the machine will be low.

Another machine recently developed by the company is an auxiliary turntable conveyor which is used back of the shovel, for delivering material to the side. This conveyor swings 360 deg., and is adjustable in and out and up and down at the discharge end. Its extreme reach is 13 ft. to each side from the track center. This auxiliary conveyor is built with the same care as its other machines, the company says, and is applicable for loading of rock or ores where it is desired to load on parallel track or to discharge the material at considerable distance to one side of the track.

Double Insulating Gap Proves Efficient

In the accompanying illustration appears a 600-volt double gap section insulator as recently developed by the Westinghouse Electric & Mfg. Co. of East Pittsburgh, Pa. This insulator has a double beam with two air gaps as insulating media. These gaps take



Wires Inserted Without Bending

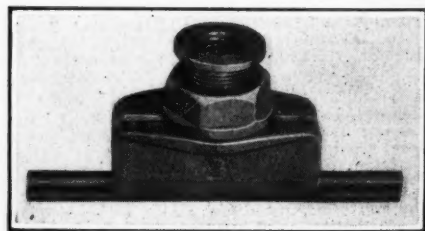
This type of section insulator possesses many advantages over its predecessors. It has a double insulating gap and the trolley wire may be inserted in either end without deformation. It is thus easy to install and efficient in use.

the shape of arcing horns and consequently there is no tendency to carry the arc over if the motorman happens to overrun the insulator when the switch is open. A short rugged blade is attached under the box in such a manner that the insulator will remain continuously in alignment.

This insulator has bronze end castings and renewable arcing tips. It is equipped with the SL type of approach which permits insertion of the wires without bending. A rotating board makes installation and removal easy. The plate can be locked open thereby complying with the requirements of the bituminous coal mine compensation rating schedule.

Great Holding Power Assured

Line material for use in mines is constantly being improved. The heavy duty trolley clamp shown in the accompanying illustration and designed by the Westinghouse Electric & Mfg. Co., of East Pittsburgh, Pa., is so constructed as to afford a maximum hold-



Low Height and Sure Grip

This trolley clamp will hold any size of wire either grooved or figure-8. It possesses several improvements over previous designs and is particularly adapted to mines affording low headroom.

ing power on any size of wire from 1/0 to 4/0 grooved or figure-8 section. This clamp is easy to install and affords a maximum wheel clearance in the jaws.

Suspension of this clamp is secured by means of a ball on a stem casting which is hung in a recess in the jaws. This eliminates excessive loads on the fulcrum pin. On account of its compact design and minimum overall dimensions this clamp is particularly adapted for use in mines where the headroom is small.